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24 APR 1924

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ROGERS VIOLET-RAY HIGH FREQUENCY VITALATOR

CURATIVE POWERS

Recognized and
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Electro-Theraputists,
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Surgeons, Hospitals,
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If the Violet-Ray High
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Treatment is new to you,
you certainly owe it to
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uses.

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Full Illustrated List
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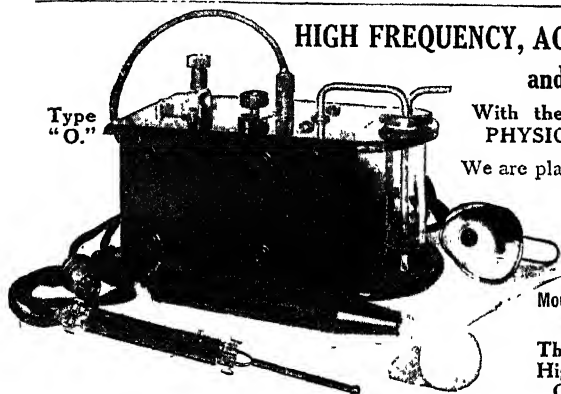
A REALLY PORTABLE
HIGH FREQUENCY
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Type "H."

Fully Guaranteed.

The most perfect Outfit for Facial, Head, & Body Massage
Complete in Oak Carrying Case & 3 Electrodes,
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HIGH FREQUENCY, ACTUAL CAUTERY, and OZONE,

With the Production of the
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We are placing on the market an
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Mounted in a neat portable
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The Type "O" delivers
High Frequency, Actual
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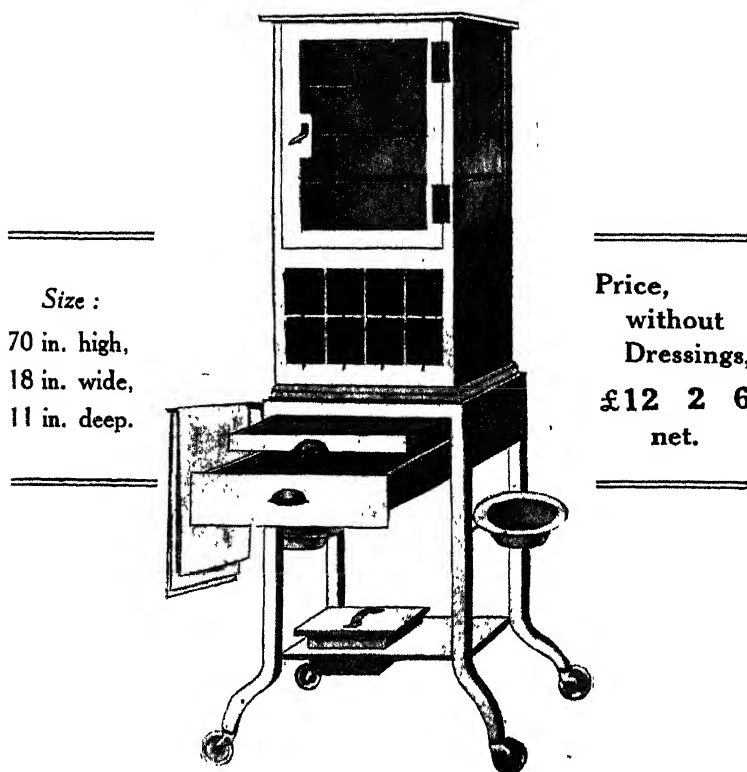
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Combined Aseptic Cabinet & Stand

FOR MINOR OPERATIONS.



Size :

70 in. high,
18 in. wide,
11 in. deep.

Price,
without
Dressings,
£12 2 6
net.

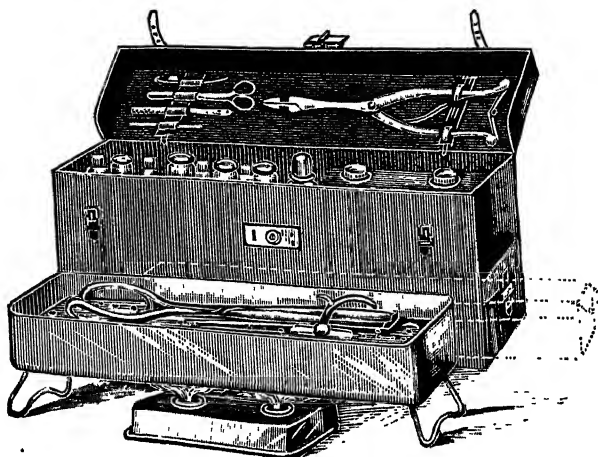
THE upper portion is a well made white enamelled Cabinet, with glass front and sides, three glass shelves, plated lock and hinges. Below are eight compartments to hold Dressings, these contain strong cardboard dust-proof boxes, to which tapes are attached to facilitate their removal from the pigeon holes.

The lower portion of the Stand has a glass instrument tray, and an enamelled metal drawer below. There are two enamelled solution bowls, and a box for soiled dressings; also an electro-plated towel rail. The whole Cabinet is on rubber-tyred castors.

R. SUMNER & CO. Ltd., LIVERPOOL.

Modern
and
Improved

MIDWIFERY BAG WITH STERILIZER.



The bag is made of cowhide (either black or brown) and has a compartment beneath into which the Sterilizer fits.

The Sterilizer has no seams, being blocked out in one piece from a solid metal sheet and heavily nickel plated.

The larger instruments are carried in Sterilizer, the top portion of the bag being reserved for Nail Brush, Lamp, Chloroform Bottle, Pill and Medicine Bottles, Dredger, leaving room for Apron, Gloves, &c.

The inside Cover has loops arranged for carrying the smaller instruments.

PRICE of the Bag, together with Sterilizer, Lamp, Nail Brush, Minim Measure in case, Chloroform Drop Bottle in case, Dredger, 3 Pill Bottles, 3 Medicine Bottles.

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An outside Canvas Cover can be supplied at 15/- extra.

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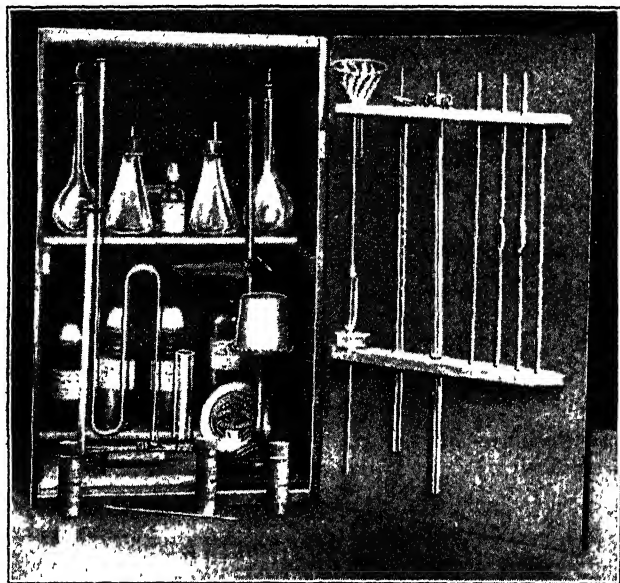
FOR

ESTIMATION OF SUGAR IN THE BLOOD

The principle of this method is as follows :

The blood is heated with a Saline Acid Solution to coagulate the Protein, and then the remaining traces of Protein are removed by Dialysed Iron. These first steps are necessary, because, in the estimation of Blood Sugar, the protein matter must first be removed.

The filtrate which contains the Blood Sugar is boiled with a solution containing Alkaline Copper Sulphate, Potassium Iodide and Potassium Iodate,



This is an illustration of Maclean's Apparatus, issued in a strong box, complete with all instructions.

as a result of which Cuprous Oxide equivalent to the amount of Sugar present is precipitated. Sulphuric Acid is then added. Iodine equivalent to the amount of Iodate in the solution is liberated, while at the same time the Cuprous Oxide is converted into Cuprous Sulphate. Cuprous Sulphate is very unstable, and reacts with the free Iodine present, and the final estimation of the amount of Iodine that has been used up in the reaction determines the amount of Sugar present in the sample of the Blood. This is found by reference to a table of comparisons.

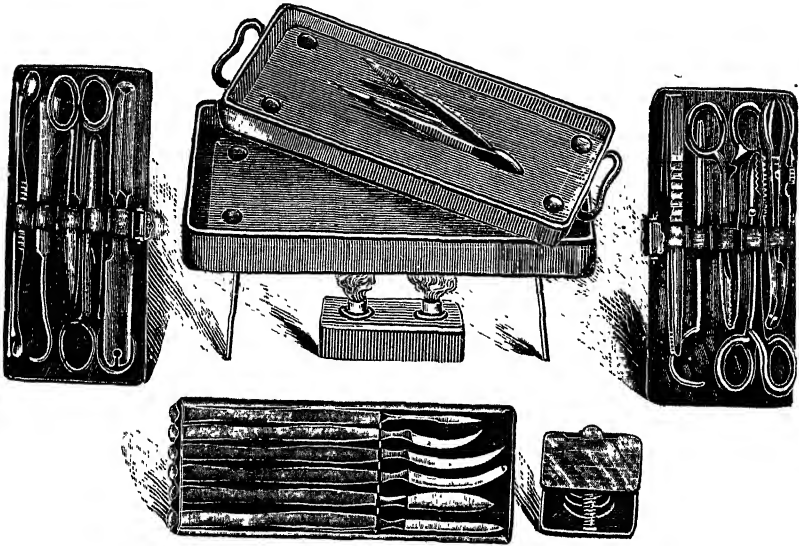
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ASEPTIC MINOR OPERATING INSTRUMENTS

WITH

SEAMLESS METAL CASE STERILIZER.



ALL the Instruments are strictly aseptic, and of the highest finish. The Knives, of the best English make, are forged out of solid steel.

When not in use the Instruments lie on electro-plated trays in the metal case or sterilizer, which is enclosed in an outer case, the dimensions being 8 by 3 inches.

The Metal Case or sterilizer is seamless, being stamped out in one piece, and electro-plated. It is supplied with Stand and Lamp.

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Needle Holding Forceps
Straight Aseptic Dressing Scissors
Curved ditto ditto
Splinter Forceps
Combined Spatula and Tongue
Depressor, with Frænum Slit
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Spring Forceps
Spencer Wells' Forceps
Pean's Artery Forceps
Double Volkman's Spoon
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Two Probes
Six Operating Knives
Needle Case with six Needles

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RECENT clinical experience of Detoxicated Vaccines has proved that they have a definite place in Vaccine Therapy. These preparations are essentially emulsions in saline of bacterial stroma, from which, by means of a special chemical process the toxic elements have been removed, and therefore doses 10 to 20 times greater than those of corresponding ordinary vaccines can be given without causing disturbing reactions, and further, their antigenic power of stimulating specific antibody production is claimed to be greater than that of ordinary vaccines.

The usefulness of Detoxicated Vaccines will especially be found in the following conditions :—

- (1) **PROPHYLACTIC INOCULATION during the period of an epidemic of Influenza or Pneumonia**, or under such circumstances, where the risk of infection is considerable, and the possibility of producing a temporary negative phase undesirable. This is best arranged for by three doses of Lancashire Detoxicated Influenza Vaccine at five days interval.
- (2) **PROPHYLACTIC INOCULATION** against Catarrhal infection generally, **in highly susceptible persons**, is most easily arranged for by using three doses of Lancashire Detoxicated Prophylactic Catarrhal Vaccine, at seven days interval.
- (3) **ACUTE CASES** in which the severe infective condition will not admit of any further demand being made upon the patient's immunological responses, such as **Acute Pneumonia, Influenza, Septicaemia, etc.**
- (4) **SUBACUTE AND CHRONIC INFECTIONS**, in which the possibility of a focal reaction, such as may follow the use of an ordinary vaccine, might produce disturbing results. Such conditions are found particularly in Ophthalmic, Aural, Renal, Prostatic Infections, etc.
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The following DETOXICATED VACCINES are prepared :—

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For Prophylaxis	12/- per set.
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For treatment in acute cases	4/- per dose.
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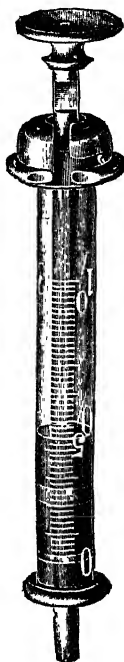
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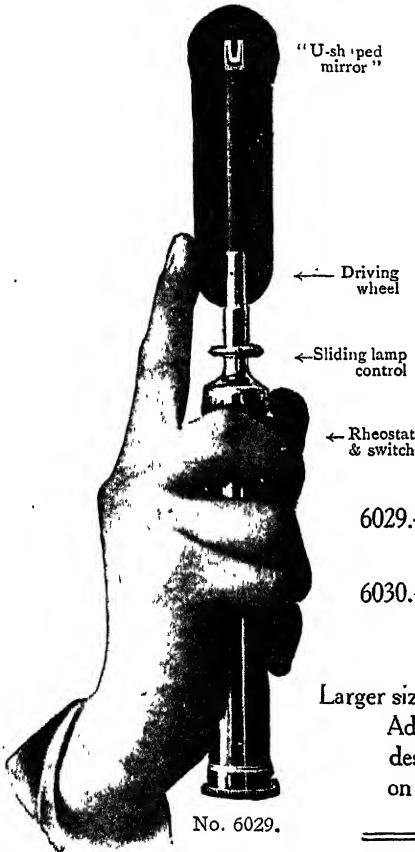


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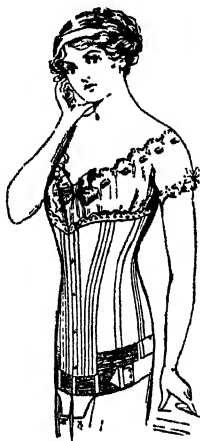
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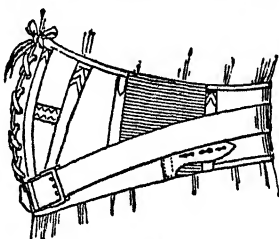
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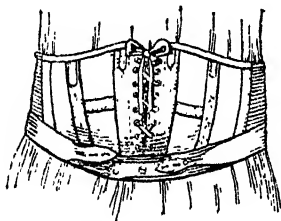
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This SYSTEM III BELT
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It is the best Gastropotosis belt.


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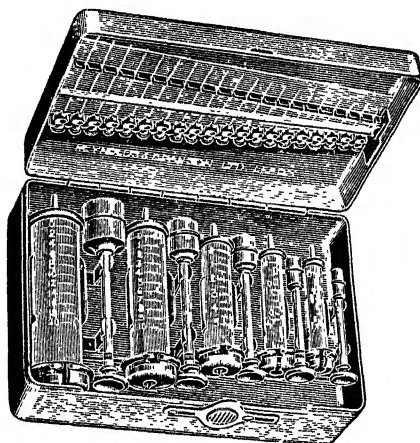
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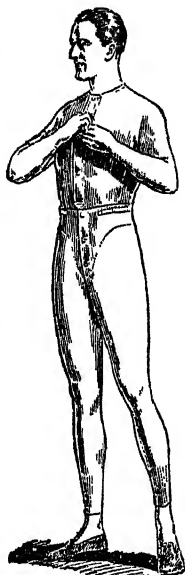
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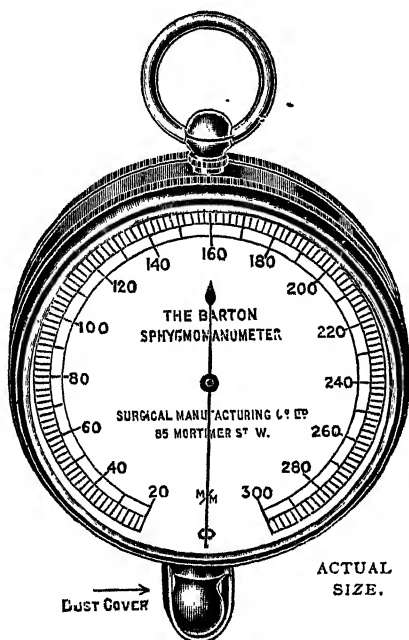
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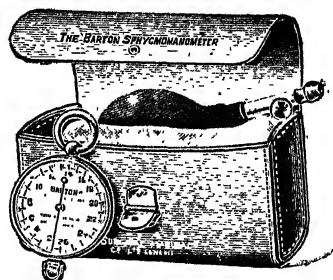
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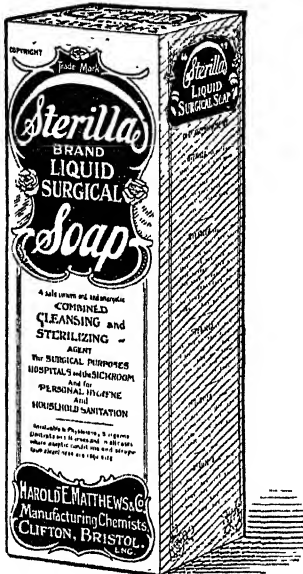
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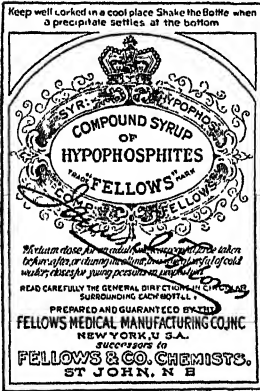
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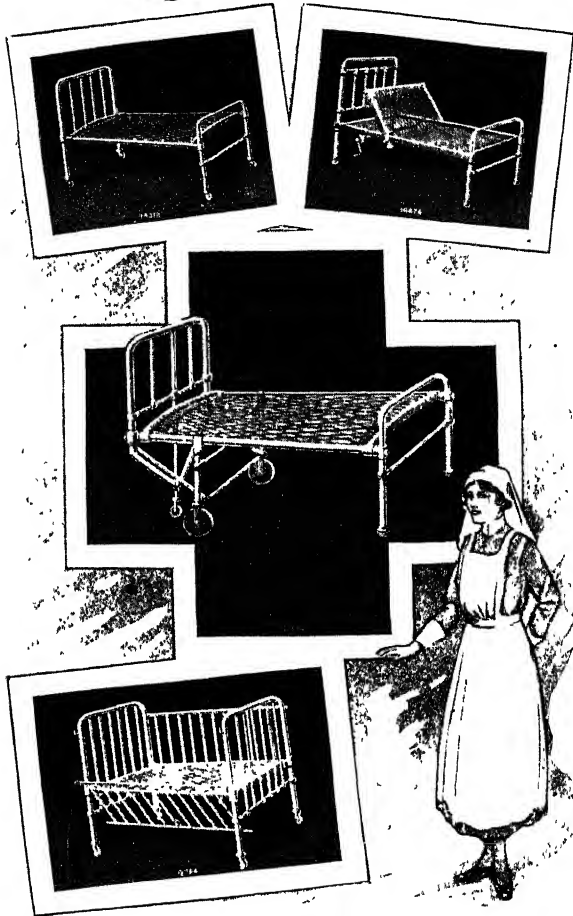
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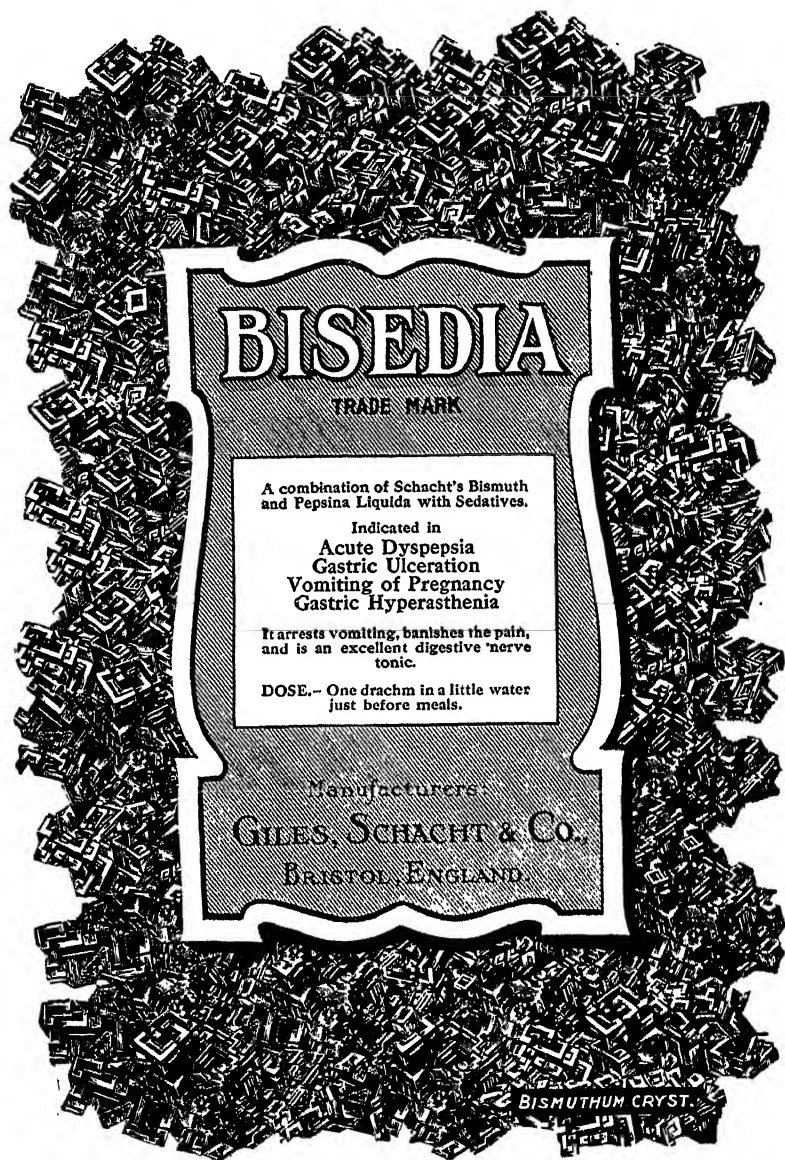
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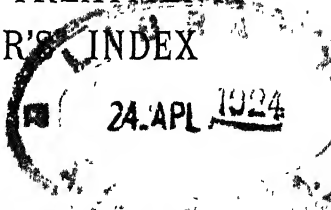
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A YEAR BOOK OF TREATMENT
AND PRACTITIONER'S INDEX



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Publishers' Preface

THE forty-second yearly edition of the MEDICAL ANNUAL needs few words of commendation. The reception of last year's volume has been most encouraging, and it is out of print ; this fact indicates clearly that the changes recently introduced have been in the right direction.

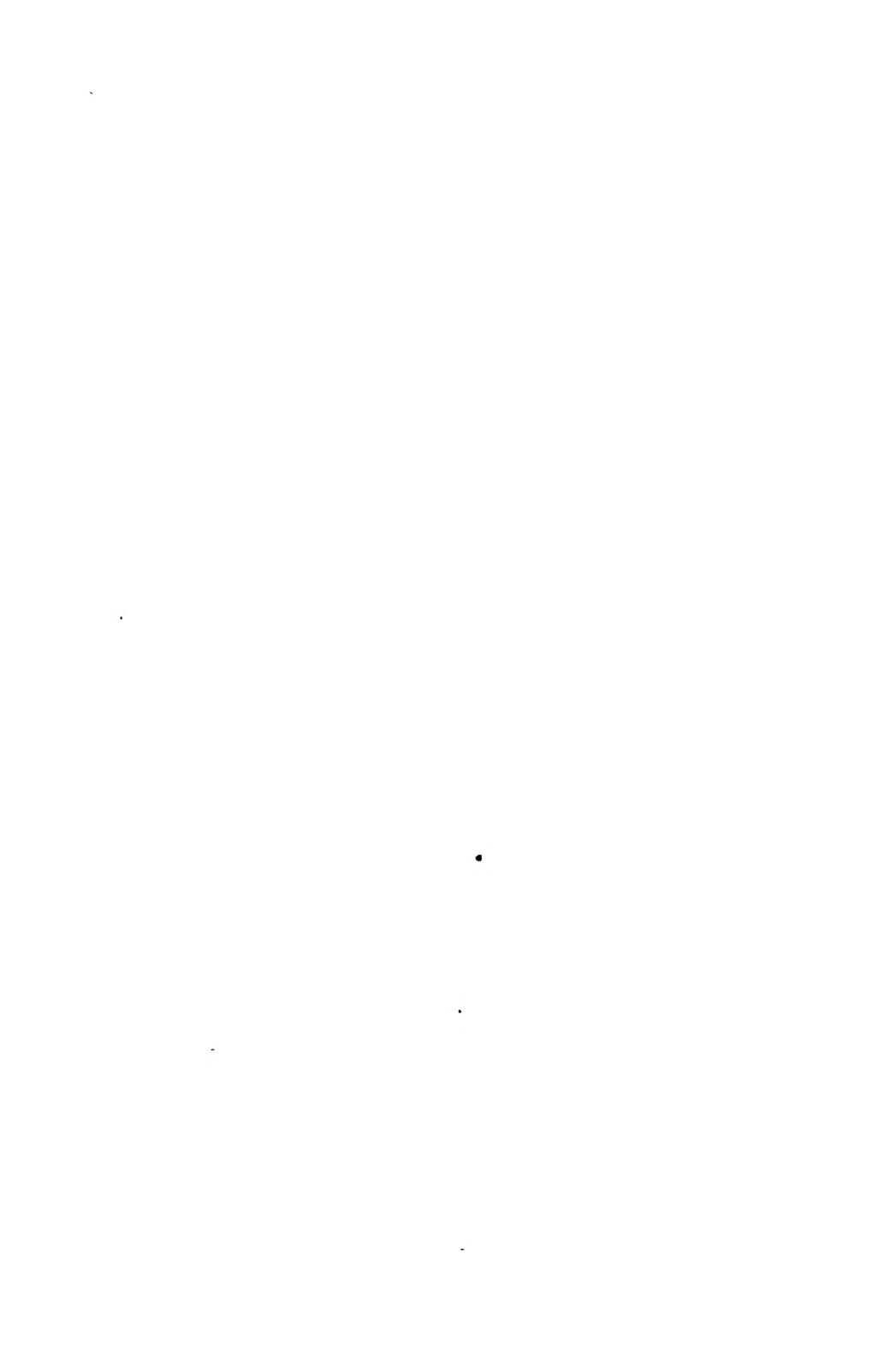
In the present volume, the Editors and Contributors have striven to improve still further the balance of the contents by treating at greater length certain subjects which had not been fully dealt with for several years ; and making room for these by handling in more succinct fashion other conditions, for fuller information as to which, the writers are able to refer the reader back to recent editions. Perfection is unattainable, but it is gratifying to know that this is the goal at which all concerned in the production of the ANNUAL have aimed.

It is a pleasing duty to acknowledge the kind and zealous co-operation of Editors and Contributors alike : without this spirit, the present measure of success could never have been attained.

THE PUBLISHERS.

The Medical Annual Offices,

Bristol, England, March, 1924.



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THE MEDICAL ANNUAL, 1924

A Review of the Year's Work in the Treatment of Disease.

INTRODUCTION

BY THE EDITORS.

WE have been much struck, in reading through the articles that go to make up this year's ANNUAL, by the vigour and zeal that our contributors have brought to the great task that is laid on them. The fact is, of course, that to everyone who takes any part in it, the preparation of the MEDICAL ANNUAL is a duty that is as inspiring as it is exacting. On the one hand, here is a large mass of medical literature, the volume of which increases every year. On the other hand, there are the doctors, most of them so fully occupied in the daily hand-to-hand struggle with disease that they can spare but little time for reading, and that only of the most strictly practical kind. There is barely time to pick up a book and look for help in dealing with the clinical problem that is occupying one's thoughts at the moment. The function of those who produce this volume is to present to their readers a means of ready access to the new work of the current year. Experience teaches us that this function is divisible into two parts.

First and foremost comes that which it has always been our policy to supply, and which cannot be better expressed than it was forty years ago, in the first volume of the MEDICAL ANNUAL. The EDITOR of that day said that "in noticing contributions we are guided by their practical usefulness to the general medical practitioner." That is still the chief aim and object of this book : to provide the general practitioner at home and abroad with a kind of serial text-book of medicine. It is not easy to ensure notice of everything that is likely to be of practical use. Certainly it is harder to do so than it was forty years ago. Nowadays we include among our readers a large number of practitioners in distant parts of the world, and it is one of our chief pleasures to think that we

are able to help them in their difficult and lonely outposts. Moreover, clinical practice has become much more specialized, and the profession is in danger of breaking up into groups, working less and less together as the years go by. Here again we believe we render a service to our colleagues that no one else can. Our paragraphs are not so long but that the general practitioner can find out what work is being done by those who have given particular and exclusive study to certain limited branches of practice. The specialist in one branch is also furnished in brief articles with news as to the way in which matters are moving in other special branches of practice.

The second object we have in view is to collect and arrange the information we give in an assimilable form so that each member of the profession may not only be furnished with precise and practical data, but also may be able to gather a general impression of the direction in which the science and art of medicine is moving. We do not pretend that our contributors write this down in so many words ; but they do impart to their articles a critical flavour by means of which they indicate their own views as to the value, or otherwise, of those measures and methods that have come under notice during the year. We are glad to note that there is an increasingly critical tone in recent volumes of the *ANNUAL*, for there is little doubt that it enhances the value of an article to the reader when it conveys to him not only a précis of what has been said on the subject during the year, but also the opinion of a trained and reliable mind as to the truth of what has been said.

But to collect into one general statement an impression of tendencies, as derived from a reading of all our colleagues' contributions, is an almost superhuman task. Yet we do discern a certain drift in medicine, and that is towards the prevention of disease. It is not that preventive medicine, as that term is commonly understood, is bulking more largely in the journals or in the *MEDICAL ANNUAL*. Indeed, the space occupied by such matters is, if anything, less. But the spirit of preventive medicine pervades the whole volume to an extent that could hardly have been foreseen when the first *MEDICAL ANNUAL* was issued. The essence of that spirit is its belief that disease is always due to a cause or causes ; that these should be made the subjects of research ; and that the knowledge thus gained should be applied to the abolition of these causes. This view of disease has always been held in an abstract form since the dawn of medical study and education, but its progress in recent years received a greatly increased momentum from the impetus given by the study of bacteriology. This is now almost spent, in the opinion of many ;

yet is it not rather the truth that to a knowledge of the bacteriological factor has been added some understanding of other factors, such as food deficiencies, endocrine disturbances, and psychical injuries; and that these are putting bacteriology in its proper place?

At all events, a fine air of optimism pervades the medical teaching of to-day. This would be worth having, even if it yielded no tangible results. All the more is it to be valued because valuable results are not wanting.

In the present volume of the *MEDICAL ANNUAL* the courage of those who have declared that no problem of disease is insoluble, no malady so hopeless but that is ought to be attacked, is finding ample justification. To take two examples only, there is the treatment of Diabetes by insulin and that of Disseminated Sclerosis by arsenical compounds. It is not claimed that these strongholds have been carried, but that they are at least open to assault, and that such success as has already been attained lends support to the hope that there are better things to follow.

We have thought it well to include a brief summary of recent research into the causation of Disseminated Sclerosis. The evidence as to the infective origin of disseminated sclerosis is so interesting, as explaining the long-known value of arsenic in general and that of the newer organic compounds in particular; and so encouraging, as affording reason for hope that even the chronic degenerations of the nervous system may some day be successfully treated or prevented; that we feel it to be of vital importance to give our readers some knowledge of it.

The treatment of Diabetes by insulin is gradually assuming a practicable form. We are told in this volume that careful dietetic tests will separate from the general ruck of diabetics those—not more than 25 per cent of the total—who need insulin; and for these it appears that a smaller dose than was at first advised may suffice. Valuable details as to the rescue of persons in coma are added. Our own small experience of the use of insulin is that it imposes upon the practitioner who uses it an increased responsibility for dieting the patient, and also for making the necessary sugar estimations. Possibly time will show that blood-sugar tests need not be made so often as we have been told, and this will solve one difficulty; but even so, it still leaves a great deal to be done by the doctor who is giving insulin, and these tasks must somehow be lessened if the treatment is to become accessible to everybody.

In this volume there is a masterly résumé of recent work on the treatment of Asthma, the drift of which may be gauged from the opening sentence : " The recognition that certain cases of asthma are manifestations of anaphylaxis has introduced a new era in the study of this disease." In the discussion that follows and amplifies this thesis the old saying, " One man's food is another man's poison ", is shown to be literally true. It appears, too, that there is some reason for believing that epilepsy also is a manifestation of hypersensitiveness to protein poisons. Work along these lines may lead to a clearer understanding and more satisfactory application of the peptone treatment of asthma and epilepsy, to which previous volumes of the ANNUAL have directed attention.

It will be noted that these examples of treatment which we have selected are illustrations of a sincere and painstaking search for rational therapeutics, based on an understanding of the causes of disease and the removal of those causes. After one more instance of this endeavour we must turn to matters of more immediate practical importance. This time it is to the article on Psychological Medicine that we ask attention. In the opening part of that article is a discussion of the value of auto-suggestion, and especially of Coué's wholesale applications of the method, and the judgement given is that while it is still the best psycho-therapeutic agent for some patients, it is ultimately bound to give way to a form of treatment such as the analytic, which looks for causes and tries to get rid of them. This volume, then, defends the thesis that the first rule of treatment is to '*remove the cause*', whether that cause be psychical, inherent sensitiveness to certain poisons, endocrine defect, or bacterial invasion : a thesis which finds an apt illustration in the paragraph on Dementia Præcox, the author of which pleads for a treatment based on the consideration of *all* the possible causal factors in each individual case.

Almost every article holds something of practical everyday value, and it is therefore an invidious task to select a few for special note ; but the fact is that some of these points have already proved useful to us in actual practice, and naturally these come first. There is an admirable summary of the pros and cons of surgery versus medicine in the treatment of Congenital Pyloric Stenosis, from which it seems that medical treatment, by washing out of the stomach and administration of anti-spasmodics, is more likely to succeed in private than in hospital cases, i.e., it is a form of treatment calling for the close individual attention of special nurses.

In a review of Oral Sepsis as a cause of systemic disease, much is made of the tooth-socket sepsis brought to light by the X rays. In contrasting this with pyorrhœa, the writer of the review makes a very interesting comparison with other forms of sepsis, such as thoracic empyema, which also are more formidable while they are closed than when they are open.

It is a moot point whether the Ulcerative Colitis seen in Britain is a sporadic form of bacillary dysentery, but on the whole opinion is turning away from this view. It follows, therefore, that vaccines and sera are of uncertain value. The most useful form of treatment is to wash out the colon, and this is often achieved best through a permanent opening into the vermiform appendix. We agree, but think that if appendicostomy is to succeed it must be done early. Fractional Gastric Analysis comes in for some damaging criticism, which will perhaps afford many medical men a sense of relief in that they will feel free from an obligation to learn and use this method of diagnosis.

Some convincing evidence is brought to the support of the belief in the possibility of 'cure' in Endocarditis Lenta. No new treatment is advocated except the use of sodium cacodylate injected intravenously (or under the skin).

Why should the use of arsenic for the destruction of microbes within the body have had so many and various applications as it has of late? As we have already pointed out, it has taken on a new lease of life in the treatment of disseminated sclerosis, and we think all our readers may like to know, under the head of Trypanosomiasis, what headway is being made in the treatment of sleeping sickness with tryparsamide and other arsenical compounds.

Another tropical disease, Leprosy, is being treated by methods that are of general interest: partly because they have been evolved from time-honoured empirical methods; partly because the principles on which they depend may prove applicable to the treatment of tuberculosis. A series of organic acids, beginning with those derived from chaulmoogra oil, and passing on to cod-liver oil, is at present being tested extensively in the former, and cautiously in the latter, disease.

The present position of the struggle against Tuberculosis is fully and dispassionately reviewed, and the various 'specific agents' are critically considered. Under the head of Whooping-cough we are sorry to find that there is still, as ever, a varied list of remedies; the desperation which this intractable disorder engenders in the mind of the doctor may be

gauged from the fact that it has been treated (and, it is claimed, with success) by means of X-ray exposures !

Under 'Jaundice, Infective', is a concise account of the disease known as *spirochaetosis icterohæmorrhagica* (Weil's disease), which has become a subject of practical importance to our readers by reason of the occurrence of an authenticated case in England and its prevalence in Japan.

Other papers of general interest deal with Dermatitis due to occupation, Drug Rashes, and treatment of Skin Disease in Childhood. We must also remark on two such diverse subjects as Tests of Liver Function and the use of Preservatives in Food.

Turning to the year's progress in Surgery, we may notice first a few general tendencies that exhibit themselves in routine technique. One is the growing popularity of long-handled instruments—forceps, hæmostats, and the like. Another is the supersession of the old-fashioned scalpel by the Bard-Parker knife. According to a well-known instrument maker, the number of employees kept on scalpel duty has been halved as a consequence. Parham and Martin bands have become very popular in the treatment of fractures needing open operation, and the sale of other appliances for the same purpose has fallen away almost to nothing.

In Abdominal Surgery, attention has been drawn to the importance of the numerous anatomical variations in the disposition of the bile-passages and great vessels. Costain has reported some animal experiments which may prove of great importance ; he states that death from peritonitis can be prevented by exteriorizing the thoracic duct. There is a well-marked reaction setting in against the indiscriminate removal of the appendix for 'chronic appendicitis'. Another field in which conservatism is gaining ground is in the treatment of cases of acute intestinal obstruction. In many such cases it is probably wiser not to explore under a general anæsthetic, but to drain the cæcum, or even a loop of small intestine, under novocain anæsthesia.

Under the heading Bladder Diseases, a summary of an important paper on the management of the tabetic bladder will be found. There is undoubtedly a field for radium therapy in growths of the bladder, and details of technique are given. Sir J. Thomson-Walker also gives a summary of an important paper of his own on problems of prostatotomy. Radium is being extensively used for cancer of the prostate.

In the Surgery of the Breast, some interesting papers have been published on the subject of post-operative swelling of the arm.

Sports Injuries are rather fully discussed, and some novel methods of treatment described.

Thoracic Surgery has attracted a good deal of attention of late, which is reflected in the long article on intrathoracic tumours and abscesses of the lung. There is also a detailed discussion of the problem of the surgical treatment of Embolism.

Leriche's Arterial Decortication still arouses much interest, and is being used experimentally for cases of irritable ulcers, trophic lesions, and incipient gangrene, but it is by no means certain yet that it has come to stay.

In Cranial Surgery, attention is called to the power of magnesium sulphate to reduce intracranial pressure, and this method of treatment promises to be both effectual and simple. Some valuable papers are referred to on the localization of tumours of the spinal cord.

In the section dealing with the Surgery of the Bones and Joints, the difficult subject of stiff and painful back is discussed. Stoffel's operation for spastic paralysis seems to mark a real advance.

One or two other points may be mentioned, which do not find a place in this particular year's review, but which seem to be sufficiently promising to deserve notice here. We have been much impressed with the value of the oxygen-injection treatment of cases of the ascitic form of tuberculous peritonitis. The abdomen is opened in the ordinary way, and after draining off the fluid the belly is filled with oxygen from a cylinder, warmed and filtered through wool to render it sterile. There have been cases, to our knowledge, in which the abdomen was at the first intervention full of tubercles, but on further inspection a few months after the oxygen treatment, all the tubercles had gone, and there was no fluid.

Another promising advance seems to be the injection of a cubic centimetre of quinine and urea solution into any painful spots, as a treatment for lumbago. This method, introduced by Souttar, has already been tried with success by several doctors in their own person !

Turning to the special departments, the subject of the treatment of Gonorrhœa in Women receives much attention, but the multitude of the methods recommended does not enhance confidence in any one of them. The article on Syphilis goes to show that the newer tests, such

as the sigma flocculation test and Kahn's reaction, are serious rivals of the Wassermann. Bismuth preparations are steadily advancing in favour, and appear to be finding a place in the routine treatment of syphilis.

Dysmenorrhœa was the subject of debate at the British Congress of Obstetrics and Gynæcology, and a number of useful suggestions for treatment are given. Ovarian Transplantation to conserve the internal secretion of the gland after oophorectomy comes in for severe adverse criticism.

The treatment of Stammering is considered in some detail. In the section on the Tonsil, several cases are referred to in which the styloid process has presented in this situation. There is a detailed discussion of the problems of diagnosis and treatment in cases of intracranial complications of otitis media.

In the section on diseases of the Retina, there will be widespread interest in the report of a discussion on the prognosis of cases showing arteriosclerotic and renal retinitis.

A great variety of topics are summarized in the review of X-ray work and Electrotherapeutics. Of general and tragic interest is the discussion of the dangers runs by the operator, and by persons exposed to massive doses.

DICTIONARY OF PRACTICAL MEDICINE

BY MANY CONTRIBUTORS.

ABDOMINAL SURGERY, MISCELLANEOUS.

E. Wyllys Andrews, M.D., F.A.C.S.

Treatment of Peritonitis by Cervical Lymphaticostomy.—Last year Costain¹ reported some very suggestive experiments. He found that if the appendix and meso-appendix in a dog are ligated, death invariably ensues from septic peritonitis in about two days. Working on the assumption that death is due to absorption of toxic materials through the lymphatics, he opened the thoracic duct in the neck in a number of dogs with such peritonitis, and found that recovery almost invariably took place, whereas all the controls died. This year² he reports a case in which this fact was applied clinically. A nine-year-old child was admitted in an advanced stage of primary pneumococcic peritonitis. Free pus was aspirated from the peritoneal cavity. The mortality in this disease, as is well known, is over 90 per cent. A lymphaticostomy produced a sudden improvement in the condition and a return to normal in a short time.

The operation was performed in the following manner. Under intratracheal ether a 3-in. incision was made along the lower posterior border of the left sternomastoid muscle. That muscle was freed by blunt dissection and drawn in, exposing the omohyoid muscle, which was drawn up. The internal jugular vein which was thus exposed was liberated down to the junction with the subclavian vein, rolled inward, and the thoracic duct about the size of a goose-quill brought into view. It was freed for about 1 in., and a ligature of plain catgut tied about it close to its entry into the vein (Fig. 1).

A $\frac{1}{2}$ -in. longitudinal incision was made into the lumen of the duct a little distance below the ligature, allowing the lymph to flow. Swabs were taken of this fluid for examination. A narrow strand of rubber was passed about half an inch down the duct. A single strand of $\frac{1}{2}$ in., plain, selvedged gauze was loosely tucked around the duct. The rubber strand, the gauze, and one end of the ligature were brought to the surface and secured to the skin. The skin incision was then closed with a short $\frac{1}{4}$ -in. soft rubber tube and a moist dressing was applied.

Referred Shoulder-pain in Acute Abdominal Disease.—Cope³ reports a large series of cases of abdominal disease causing referred pain in the shoulders. Perforated ulcers of the duodenum are almost sure to cause shoulder-pain after a few hours; whereas it very rarely occurs in appendicitis, and only when the

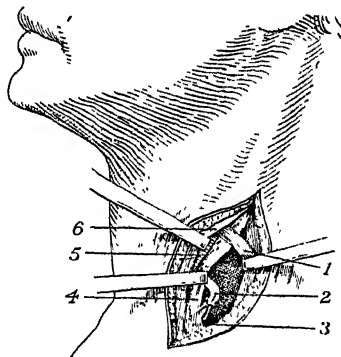


Fig. 1.—Cervical lymphaticostomy. 1, Omohyoid; 2, Thoracic duct; 3, Subclavian vein; 4, Internal jugular vein; 5, Left carotid artery; 6, Left sternomastoid. (Redrawn from 'Surgeru, Gynecology, and Obstetrics'.)

appendix is retrocaecal. At times referred shoulder-pain is intense and stabbing, but in the majority of cases it is not severe, and if the patient has violent abdominal pain he will not speak of his shoulder-pain unless questioned about it. If looked for, this type of pain is much more common than ordinarily imagined. He even goes farther and quotes numerous cases to prove that more detailed localization is possible. Pain in the anterior portion of the shoulders is due to irritation of the anterior portions of the diaphragm, and suprascapular pain comes from irritation of the posterior segment of the diaphragm. Sudden hypogastric pain in a woman, associated with pain in both shoulders, is almost pathognomonic of ruptured tubal pregnancy. In this latter assertion he is strongly supported by Rubin.⁴ The interpretation is, of course, a sudden subphrenic hæmoperitoneum.

Capps and Coleman⁵ have made some very interesting experimental observations on the subject of *localization of pain sense in the parietal and diaphragmatic peritoneum*. Pneumoperitoneum was induced in a number of subjects, a wire was introduced through a trocar without anaesthesia, and the sensibility of the parietal peritoneum was tested both to dull pressure and scratching. It was found that in the anterior wall firm pressure of a beaded end of wire was accurately localized, generally a little below the point stimulated. If the peritoneum was scratched, a very sharp pain was evoked. When the diaphragm was thus stimulated, a correspondingly severe pain in the neck was produced. This was also very accurately localized; it was referred to a very small spot on the anterior border of the trapezius. It is interesting to note that in none of the cases was there any sensation of pain in the diaphragm itself or along the course of the phrenic nerve. If the edges of the diaphragm are irritated, a vague, poorly localized, subcostal pain is produced.

Surgery of the Adrenal Bodies.—This subject has received considerable attention in Russian clinics. Besides the occasional tumours and cysts of the adrenals, resections have been undertaken for the cure of epilepsy and of the so-called cases of spontaneous gangrene. For the former the results have not been encouraging, but many cases of gangrene have shown marked improvement. Oppel seems to deserve the credit for the recent introduction of these measures about three years ago. The technique of resection has received considerable attention. Oppel⁶ and Grigolaff⁷ prefer the lumbar route. The technique is practically the same as that of a kidney incision. The kidney, instead of being delivered, is pushed downward and the adrenal thus brought into sight. The left side is the easiest, and is therefore chosen. Considerable difficulty may be encountered in tying the ligatures in the bottom of such a deep wound. Brünig⁸ prefers the transperitoneal method. A left L-shaped incision as for a splenectomy is made, the splenic flexure of the colon is mobilized and pushed downward, and the pancreas pushed upward. This operation has proved more difficult than the lumbar route, but has the advantage of working in a field in which the structures are more easily visible. Melnikoff⁹ describes a procedure, which he has worked out on the cadaver, that consists in mobilizing or cutting the two lower ribs, pushing the pleura upward out of the way, and exposing the adrenals through the diaphragm.

REFERENCES.—*Canad. Med. Assoc. Jour.* 1922, Nov.; ²*Surg. Gynecol. and Obst.* 1923, March, 365; ³*Brit. Jour. Surg.* 1922, Oct., 192; ⁴*Jour. Amer. Med. Assoc.* 1923, April 14; ⁵*Arch. of Internal Med.*, 1922, Dec.; ⁶*Westnik Chirurgii*, 1922; ⁷*Zentralb. f. Chir.* 1922, Sept. 16; ⁸*Ibid.* 1920, No. 43; ⁹*Ibid.* 1923, March 3.

ACNE VULGARIS.

E. Graham Little, M.D., F.R.C.P.

Levin and Kahn¹ conducted some investigations in the output of urea, nitrogen, non-protein nitrogen, and creatinine in the blood in 12 cases of this affection, and found no abnormalities of note. They further estimated the

calcium content, which Thro and Ehn reported was increased in this disease. The authors are unable to confirm this finding. They were able to establish a slight increase of blood-sugar, amounts of from 0.1 to 0.12 per cent being found in 23 cases in an examination of 34 cases. An investigation of glucose tolerance yielded normal curves. A mild acidosis was found in 10 of 34 cases. A study of the faeces in 23 cases showed a marked carbon dioxide fermentation, and no loss of activity of enzymes. Their inferences from these investigations lead them to recommend Reduction of the Carbohydrates in Diet, Gastro-intestinal Supervision, Administration of Alkalis, and Organotherapy, thyroid, ovary-lutein, and pituitary having all been found of some benefit.

REFERENCE.—¹Amer. Jour. Med. Sci. 1922, Sept., 379.

ACTINOMYCOSIS.

Sir W. I. de C. Wheeler, F.R.C.S.I.

This infectious disease is either gradually becoming more common, or keener observation has improved diagnosis. The true method of infection has not as yet been proved. Actinomycosis has resulted in the finger from injury inflicted by an opponent's tooth in a fist fight, and it has been demonstrated that the *Actinomyces bovis* can be found in carious teeth and tonsillar crypts of normal persons. The common belief that the infection is brought to man from vegetable sources—barley heads, grains, grasses, etc., especially round the mouth—is open to doubt. The common organism taken from vegetable sources is aerobic and not anaerobic. Patients with acute or subacute infections of the neck and face, especially in the presence of dental trouble, should be examined for actinomycosis. When a sinus persists after drainage of an abdominal abscess, actinomycosis must not be forgotten.

New, Figi, Sandford, and Magath¹ report fully on the whole subject. Three cases of actinomycosis of the tongue are mentioned, but disease of this organ is extremely rare, and, when it arises, it must be distinguished from tertiary syphilis, tuberculosis, epithelioma, cysts, and fibroma. Incision, with the internal administration of Potassium Iodide, produce satisfactory results. Wide Excision with primary suture is the treatment of choice if an isolated nodule is present. Radium is beneficial.

Brockman² discusses *actinomycosis of the right iliac fossa*. The disease manifests four stages: the first with varying abdominal symptoms mainly confined to the right iliac fossa; the second with the presence of a tumour in that locality; the third with sinus and fistula formation; and the fourth with processes of repair, or more often with a gradual decline ending in dissolution.

DIAGNOSIS.—The diagnosis of this infection can, of course, only be made with certainty after discovery of the sulphur granules of the *Actinomyces bovis* in the pus from abscess or sinus. In the cases which follow appendicectomy for an acute or subacute condition, it is well-nigh impossible to recognize the infection at the time of operation. At this stage one would have to examine systematically the contents of every appendix removed for this specific organism. Even then the difficulties of such detection are so numerous, that one cannot have enough hopes of success to justify the time expended.

The appearance of a mass in the right iliac fossa or in the actual scar of the operation should at once make the surgeon suspect the presence of this infection. It is no uncommon practice, as records show, for such a case to be re-explored with the fear that a swab has been left behind. An incision reveals a hard indurated mass which may or may not at this stage deliver the typical yellow granules.

In the patients who appear before us at a later stage with marked tumour formation there are certain clinical features which at least should make us strongly suspect the true nature of the condition. The patient is more usually

of the male sex. He has usually had pain of a varying degree in the right iliac fossa for some few days. He will complain of exacerbations of this pain on moving the right lower limb, especially on mounting a vehicle or on going upstairs. This feature of the pain is so characteristic of this particular infection in the ileocaecal region as to prove a strong foundation stone on which to lay an exact diagnosis. The temperature and pulse are not as a rule much raised, though these vary with the degree and virulence of the secondary infection already present.

It is often far from easy to clinch the diagnosis of these cases: it requires patience and care. One point the author emphasizes most strongly: the proper person to look for the ray fungus is the surgeon or his own assistant. The easiest and most certain method is to allow the discharge from the sinus to run down the side of a sterile test-tube whilst dressing the case. If the sinus does not yield sufficient for this, gently curette the walls of the track with a spoon, and allow the blood which escapes to flow in a similar fashion. The granules will cling to the sides, allowing the liquid portion of the pus to run to the bottom of the tube. They can then be picked out and examined microscopically. If all cases were so dealt with, the diagnosis could be settled far sooner than is often the case. Too frequently the pus is kept and allowed to clot before reaching the bacteriologist. It must be remembered that it is essential for diagnosis and culture that the actual yellow granules be found and isolated. They alone bear the significant club formation. This is not easy if the pus has clotted, and the streptothrix soon dies at room temperature, so that the chances of thus finding it are greatly diminished, as experience often proves.

TREATMENT.—The treatment of actinomycosis in the region of the right iliac fossa is of a more exacting and anxious nature than is the case with the same infection in other situations of the body. The condition is here complicated by the extent and variety of secondary infections which are invariably present, and also by the wide extent of the infected area when the diagnosis has been definitely proved.

The first important line of treatment with large doses of **Potassium Iodide** should be started as soon as the clinical features warrant even the suspicion of the true nature of the case. As regards operative measures, the condition is one in which the surgeon who holds his hand gets the best results. At first sight the prevalence of secondary abscesses in the liver of a definite pyæmic origin would, perhaps, be in favour of an extensive intestinal excision as soon as diagnosis is certain. Such an operation is bound to carry in its train a large degree of risk. Also, there is no disease found post mortem in the intestine: the infection is a retroperitoneal one, and invades the portal system only at a late stage of the disease. Any form of resection or extensive curettage is strongly to be deprecated. The activities of the surgeon should be limited to ensuring free drainage when abscess formation and softening occur. **Hydrogen Peroxide** used as an irrigating fluid is probably the best local application. It helps, more than any other disinfectant, to diminish the peculiarly foul odour which arises from actinomycotic infection of the abdomen. The smell when once recognized is peculiar to such conditions; perhaps Waring's description of an odour like sulphuretted hydrogen gives the best idea which words can convey. It is particularly offensive, penetrating, and clinging.

Medical treatment consists chiefly in the administration of increasing doses of potassium iodide until the patient is taking 100 gr. three times a day. When this dose is reached, many authorities advise that the drug should be discontinued periodically for a few days to allow softening to take place, and thus ensure a more certain effect of the drug on the infective organism. Some have

advocated the use of **X Rays** in cases of this infection. This form of treatment was used in one case, but with disappointing results. Heyerdath has reported successful results from the use of **Radium**. But here, and in the reported improvements under the application of X rays, the lesions have all been in the cervicofacial region, where efforts are not crippled from the start by a foul secondary infection. Four patients were treated with **Autogenous Vaccines**, both for their actinomycosis and secondary infections. The disappointing effect of such treatment was shown only too clearly by the end-results of these cases.

PROGNOSIS.—The present prognosis of actinomycosis of the right iliac fossa can only be described as gloomy in the extreme. The average mortality of recorded cases of abdominal infection of this nature is somewhere in the neighbourhood of 80 per cent. The length of time which intervenes between the first symptoms and death varies from six months to two years. There is no doubt that the life of the patient is of longer duration in those cases where conservative surgery has played a part. It was in a large measure the main factor responsible for the lower mortality in Waring's series.

Until the life-history of the infecting agent has been more fully worked out, so that measures of prevention may be adopted, the only hope of reducing the present high mortality of this disease must lie in earlier diagnosis, with the possibility of prompt treatment.

REFERENCES.—¹Mayo Clinics, 1921; ²*Brit. Jour. Surg.* 1923, April, 456.

ALCOHOL FROM THE DIETETIC AND PUBLIC HEALTH STANDPOINT.

Joseph Priestley, B.A., M.D., D.P.H.

Lord Dawson of Penn has spoken, and to some purpose. He has told the truth about alcohol—its value as a comforter and a lessener of worries in the stress and troubles of the life of to-day—especially the workers' life. A glass or two of beer after the day's work puts a different complexion upon the workers' outlook. The muscle-fag from which the manual worker suffers is lessened, if not entirely dissipated; and the same applies to the brain-fag of other workers, the black-coated brigade and the professional and technical classes.

Let the matter be considered in its true perspective. It cannot be denied that brandy and champagne have saved many lives, by being administered at the crises of diseases. It cannot be proved that the moderate use of alcoholic beverages has, in any single instance, shortened by one day or one hour a man's or a woman's life. Alcohol in itself is not a food, but alcoholic beverages are. What more can be said? In its proper place, and season, alcohol is good, whether viewed from a physiological, economic, or medicinal standpoint. It is a product of the fermentation of a saccharinic (sugary) liquid, produced by a microscopic fungus called yeast, and is known as ethyl or vinic alcohol C_2H_5OH . Expressed in more technical terms, alcohol means the different compounds, which are known as the hydroxides of hydrocarbon radicals, consisting of carbon, hydrogen, and oxygen in different combinations. Ethylic or vinic alcohol is the true or pure alcohol, but there are other alcohols given off during fermentation or distillation with higher boiling points, known as methylic, amylic, butylic, propylic, etc., alcohols. These 'other' alcohols are the so-called 'fusel oil', and are the higher homologues of ethylic or vinic alcohol. By-products of fermentation and distillation are known as 'furfural'; 'pyridine', etc.

The medical or beneficial action of pure alcohol (in small, diluted quantities) consists in stimulating, both directly (by contact) and indirectly (by absorption),

the internal lining of the stomach, causing an expansion of the blood-vessels and an increased flow of blood around the glands of the stomach, with a consequent increased activity of digestive processes. Peristalsis is increased. The alcohol that is absorbed into the blood-stream is diffused throughout the system, causing similar effects, viz., increased vascular and functional activity, and finally undergoes combustion within the tissues of the body, causing warmth and vital force or 'anti-fag', and increasing, at the same time, still more the bodily functions.

Such are the beneficial results of pure or true alcohol, when consumed internally in small, diluted quantities. Increase these quantities, and the results are injurious and may prove mortal. Vasomotor nerves are paralysed, with resultant interference with the cell-actions of the body; bodily heat is decreased as the result of increased radiation and lessened combustion; elimination of waste products is interfered with, and functional activities generally are depressed; neuritis and cirrhosis of the blood-vessels and connective tissue arise from the irritation of the unburnt alcohol, etc.

One to one and a half fluid ounces of *absolute* alcohol in twenty-four hours is the amount that can be completely oxidized in the body. This is represented by ordinary beer or stout (1 to 2 pints), light wines ($\frac{1}{2}$ to 1 pint), heavy wines ($\frac{1}{4}$ to $\frac{1}{2}$ pint), and spirits ($\frac{1}{16}$ to $\frac{1}{8}$ pint).

It must not be assumed that telling the truth about alcohol from a dietetic and public health standpoint means that it is not realized that the abuse of alcohol may be a national curse, causing poverty, tuberculosis (indirectly), vice, and crime, etc., and that, consequently, repressive measures may be called for, e.g., local option, prohibition, or other stringent measures in the form of regulations.

ALOPECIA AREATA.

E. Graham Little, M.D., F.R.C.P.

McCafferty¹ follows closely Sabouraud's classification and theories of causation of this disease, and offers some useful formulæ and hints derived from his own experience. Lotions are generally more useful than ointments. The latter should not be left on the scalp for more than twenty-four hours. Ointments may be alternated with tonic lotions. Shampoos should be selected according to the condition of the scalp.

DRY SCALP. (Shampoo.)

R	Olive Oil Soft Soap	72 parts	Oil of Pine Needle	} 1 part
	Alcohol (pure)	25 parts	Menthol	
			Eucalyptol	

Sig.: As shampoo. This is a good foamy shampoo with pleasant antiseptic odour. It contains no free alkali, and imparts a beautiful lustre to the hair.

SEMI-OILY SCALP.

R	Olive Oil Soft Soap	71 parts	Menthol	} 1 part
	Distilled Water	25 parts	Oil of Pine Needle	
	Potassium Carbonate	1 part	Eucalyptol	

Sig.: This is a cream shampoo, and is dispensed in a jar.

OILY SCALP.

R	Cocoonut Oil Soft Soap	50 parts	Menthol	} 1 part
	Potassium Carbonate	5 parts	Olei Pini Sylvestris	
			Eucalyptol	
			Aq.	q.s. ad 100 parts

Sig.: A splendid shampoo for a scalp that is very oily with much dandruff.

DRY SCALP. (Tonic.)

R	Hydrarg. Chlorid. Corros.	gr. ij	Olei Amygdalæ Express.	℥iv
	Resorcinol		Tinct. Quillaia, q.s. ad fiat emulsion	
	Chloral, Hydrat.		Aq. Calcis	q.s. ad ℥ viij
	Spt. Acidi Formici	āā ℥j		

Sig.: Apply to scalp five times a week and rub in thoroughly.

DRY OR OILY SCALP. (Ointment.)

R	Hydrarg. Oleat. Recent.	℥iij	Petrolat. Liq.	q.s. ad ℥j
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M. ft. mist. et Sig.: Apply once a week, following by shampoo next morning.

OILY SCALP. (Tonic.)

R	Hydrarg. Chlorid. Corros.	gr. ij	Tinct. Cantharid.	℥ss
	Resorcinol		Spt. Vini Rect.	℥iv
	Chloral, Hydrat.	āā ℥j	Aq. Dest.	q.s. ad ℥ viij

M. ft. Sol. et Sig.: Apply to scalp five times a week.

DERMATITIS SEBORRHOICA. (Ointment.)

Acid. Salicyl.	gr. xv	Petrolat. Alb.	q.s. ad ℥j
Sulph. Præcip.	℥ss		

M. ft. Ung. et Sig.: Apply once or twice a week. Follow with shampoo next morning.

Lotions prescribed for women may advantageously contain perfumes, which are mostly disliked by men. The most acceptable perfumes are extract of violet, lilac, lily of the valley, etc. The addition of a colouring agent, carmine, methyl blue, or violet, in small quantity, adds to the attractiveness of the lotion without risk of staining the hair. The warning that resorcin may stain blonde or grey hair is to be kept steadily in mind. Sulphur and mercury should never be prescribed together, and if they are to be used alternately one should be removed from the scalp before applying the other. Finally, careful brushing of the hair daily with a brush with long stiff hairs is recommended, and the brushes should be washed and dried in the sun every ten days.

For use in post-febrile alopecia, Sabouraud² prescribes:—

R	Tincture of Lavender	20 grm.	Potassium Nitrate	0.5 grm.
	Acetone, Anhydrous	30 grm.	Alcohol, 90 per cent	to 300 c.c.
	Distilled Water	30 grm.		

REFERENCES.—¹N. Y. Med. Jour. 1922, Oct. 4, 369; ²Practitioner, 1922, Nov., 406.

AMŒBIASIS.

Sir Leonard Rogers, M.D., F.R.C.P., F.R.S.

ETIOLOGY.—A. Ortoni and M. Gazzola¹ record a case of dysentery in which large numbers of *E. coli* were found in the stools, to which they are inclined to attribute the disease.

R. Knowles, L. E. Napier, and B. M. D. Gupta² have studied the reactions of the stools in terms of the hydrogen-ion concentration, and found a low reading in active amœbic dysentery.

TREATMENT.—A. C. Reed³ discusses the diagnosis and treatment of amœbic colitis, and lays stress on the diverse and often indefinite symptoms in chronic cases, indicating the necessity of searching for *E. histolytica* and its cysts in all obscure abdominal cases, especially with diarrhœa, in endemic areas of the disease. He finds that 90 per cent can be cured by massive doses (90 to 120 gr.) of Ipecacuanha in salol-coated pills up to five days, followed by 0.3 gr. Neo-salvarsan intravenously after two days' rest, and 3 gr. of Emetine Bismuth Iodide in 1-gr. doses daily for a week, and a bowel wash of one gallon of 1-2000 Thymol Solution every evening for six days, this treatment being repeated

the following week, but beginning with 0.9 gr. neosalvarsan, repeated one week later. A. S. M. Macgregor and F. Frew⁴ have treated 15 cases, 7 with *E. histolytica* present, with one tablet of Aleresta thrice daily orally and 1 gr. of emetine hypodermically for ten days, the course being repeated once or twice with intervals of a week's rest; all were chronic resisting cases; 2 of those followed up remained well, and 5 relapsed. P. M. Rennie⁵ found two or three courses of emetine bismuth iodide of curative value, and followed in successful cases by gain in weight.

W. Menk,⁶ who considers emetine injections to be of only slight and very temporary value in amoebic dysentery, advocates the use of enemas of 'Yatren' (consisting of iodine 5, oxychinolin 8, and sulphate of soda 7 parts) as an adjunct to emetine and E.B.I. treatment in chronic cases, a course of five to six weeks of a 2.5 to 5 per cent solution being used and repeated for a month at six monthly intervals. E. Birt, Dekan, and Leiter⁷ report on the use of the yatren treatment in Shanghai, using 100 c.c. of a 10 per cent solution twice a day per rectum in 14 chronic and 14 earlier cases with successful results in 16. W. Menk,⁸ in a further paper, thinks 10 per cent solutions too strong, and advises 200 to 400 c.c. of a 5 per cent, which should be combined with or alternated with emetine.

Amoebic Liver Abscess.—E. C. C. Maunsell⁹ reports a case of amoebic liver abscess, which had ruptured into the abdomen, and was drained successfully in spite of another large abscess having to be evacuated through the right ribs.

TREATMENT.—A. I. Ludlow¹⁰ reports on 100 liver abscess cases treated at Seoul, the patients being all Koreans, early Emetine treatment of amoebic dysentery having prevented the occurrence of liver abscesses in European subjects; no patient treated early at the hospital developed an abscess; 8 were females, and many of the total patients were alcoholic. Deep-seated local pain, elicited by a sudden thrust of the end of a finger, was of diagnostic help. The open operation was used in this series, after a preliminary course of two to four days' emetine injections, with good results, the mortality having been only 10 per cent. Recently, in some further unreported cases, Rogers' method of repeated aspiration and hypodermic injections of emetine has been tried with promise of good results. E. Bressot¹¹ in Morocco reports on 26 liver abscess cases treated by the open operation within two years, with 5 deaths, or 19 per cent, but in two of the fatal cases the abscesses were multiple. He discusses Rogers' method, which he read of after the completion of this series, and thinks the good results of the aspiration and emetine method must have been due to early diagnosis. [Quite the contrary is the case, many of Rogers' cases having been too advanced for the open operation to afford much chance, including two cases from which six pints of pus were aspirated, with recovery in both.—L. R.] K. K. Chatterji¹² reports 69 liver abscess cases treated by drainage and suction with Klapp's apparatus, with a mortality of 26 per cent, and 186 cases treated by emetine injections and aspiration, combined with irrigation through the aspirating cannula at the time of the operation in 153 of them, with the remarkably low mortality of 1.6 per cent, against a former mortality in Calcutta by the open operation of 56 per cent.

P. Manson-Bahr, G. C. Low, and J. J. Pratt¹³ also report on the use of Rogers' method in the less dangerous chronic cases seen at the London School of Tropical Medicine, 15 consecutive cases being treated without a death, and remark that it presents many obvious advantages over the far more serious open operation. The technique described is similar to that used for many years in Calcutta. E. Escome!¹⁴ describes 25 cases of liver abscess cured by emetine without any surgical intervention, thus confirming the remarkable

properties of that drug, which Rogers has shown can clear up even multiple small amœbic abscesses, although recovery is quicker if the larger collections of pus are also aspirated.

REFERENCES.—¹*Presse méd.* 1922, Dec. 6, 1052; ²*Ind. Med. Gaz.* 1922, April, 151; ³*Amer. Jour. Med. Sci.* 1922, Oct., 586; ⁴*Glasgow Med. Jour.* 1922, Aug., 114; ⁵*Lancet*, 1922, ii, 1374; ⁶*Lunch. med. Woch.* 1922, Sept. 1, 1280; ⁷*Ibid.* 1923, Feb. 26, 205; ⁸*Ibid.* April 9, 306; ⁹*Ind. Med. Gaz.* 1922, Sept., 340; ¹⁰*Surg. Gynecol. and Obst.* 1923, March, 336; ¹¹*Presse méd.* 1922, Sept. 2, 757; ¹²*Ind. Med. Gaz.* 1922, Sept., 333; ¹³*Lancet*, 1923, May 12; ¹⁴*Bull. Soc. Path. Exotique*, vol. xv, No. 7, 537.

AMPUTATIONS.

Sir W. I. de C. Wheeler, F.R.C.S.I.

The Sleeve Amputation.—The writer¹ found it necessary to depart from orthodox teaching in certain cases of fracture of the femur requiring amputation, and recommends a procedure which he calls the sleeve amputation (Figs. 2, 3). Three cases requiring this operation are discussed in detail by way of example.

In the first case the injured man was seen eight days after the accident. The leg was gangrenous as far as the knee, the thigh was swollen, œdematous, discoloured, and covered with vesicles, as if gangrene was imminent. The original injury was a simple fracture of the femur in the upper third. No tourniquet could be employed owing to the condition of the soft tissues of the thigh; for the same reason the vessels could not be controlled by compression. The vessels were exposed and held by an assistant. Amputation by circular incision was performed through the knee-joint just

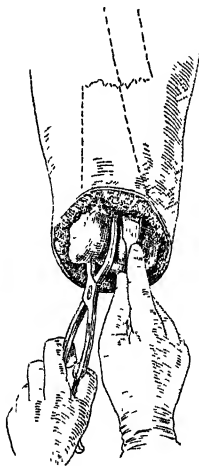


Fig. 2.

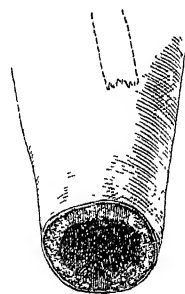
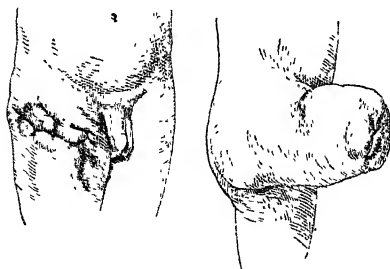


Fig. 3.

Fig. 2.—Sleeve amputation. The gangrenous log was removed through the knee. Enucleation of the bone below the fracture. (Wheeler.)

Fig. 3.—Appearance at completion of the sleeve amputation. (Wheeler.)



Figs. 4, 5.—Drawing from case of fracture of the thigh with gangrene. (Wheeler.)

above the line of definite gangrene, and the femur was removed from the line of fracture by rotatory movements and the use of a periosteal elevator, like a cork from a bottle, leaving a sleeve of soft tissues behind. There was no bleeding, the vessels were thrombosed, and no ligatures were required. The patient recovered with an excellent stump; only a limited area of skin and superficial fascia sloughed below Poupart's ligament (Figs. 4, 5).

In a second case the patient was seen six months after receiving a compound fracture of the femur

from a bullet wound. There was no attempt at union, and the soft tissues were riddled with sinuses in the neighbourhood of the fracture in the upper

part of the thigh (*Fig. 6*). The patient was very ill from prolonged sepsis. Here again it would have been necessary to amputate through the hip-joint to get above the disease. The sleeve amputation was performed. The soft tissues were divided at the knee, and the leg with the lower fragment of the femur removed.



Fig. 6.—Patient some years after the sleeve amputation. Note the position of the healed sinuses. Amputation at the hip-joint would have been necessary to obtain healthy flaps above the diseased area. The stump supports an artificial limb admirably. (*Wheeler*.)

It is pointed out in the paper that good results will be obtained by amputating well *below*, or even through, the diseased or injured area in certain cases, and the traditional method of attempting to get healthy flaps by working well above may be followed by mutilating and disastrous results.

REFERENCE.—*Practitioner*, 1923, Nov.

ANÆMIA, PERNICIOUS. (*See* PERNICIOUS ANÆMIA.)

ANÆSTHETICS. (*See also* EYE, GENERAL THERAPEUTICS OF; RESPIRATION, ARTIFICIAL.) *F. Blomfield, O.B.E., M.D.*

One of the most interesting papers relating to ether that have appeared within the last year rehabilitates pure ether as an anæsthetic. It had been maintained, first by Cotton in America and later by Mackenzie Wallis in this country, that pure ether was not in itself an anæsthetic. Wallis attributed to ketones, present as impurities, the anæsthetic action of ether. The paper to which we refer, by Dale, Hadfield, and King,¹ makes it clear that, so far from destroying the anæsthetic property of ether by purifying it, on the contrary, the purer the ether the better was it as an anæsthetic. Cotton attributed the anæsthetic property of ordinary ether to the presence of small quantities of dissolved gases, ethylene and carbon dioxide being those identified. He mentioned that by the addition of these to pure ether it was possible to deprive human beings of

all sensation of pain without clouding consciousness, in fact to produce complete analgesia without anæsthesia. It is very doubtful whether ethylene in the small quantities used has any effect at all. As regards carbon dioxide, Dale points out that it is normally present in the air of the lungs in the proportion of about 5 per cent; it is hard to see, therefore, how its presence in Cotton's ether in the proportion only of 0.5 per cent could have any anæsthetic effect. To test the action of perfectly pure ether, samples were prepared with the utmost care by King, full details of the process being given in the article. These were tested first on cats, and the chief difference noted between the perfectly pure ether and ordinary anæsthetic kinds was the diminished irritability of pharynx and trachea with the former. Moreover, it was found that less of the pure ether was needed to maintain anæsthesia than of the less pure brands. The efficiency of ethanæsial was neither greater nor less than that of pure ether when tested with cats. The pure ether was then tried with eight human patients, and the results were "decisive in favour of the efficiency of perfectly pure ether as an anæsthetic". In some of these cases a Clover's inhaler was employed throughout, in others an open method after induction with a Clover. In no case was any other drug except atropine used in addition to the ether. The cases included abdominal operations and a vaginal hysterectomy. The authors conclude: "This demonstration of the satisfactory properties of pure ether has seemed to us important, not merely as clearing away difficulties and anomalies from the theory of the subject, but as indicating the true aim of a practical policy. In our opinion efforts to improve the properties of ether, as an anæsthetic for ordinary use, can be most profitably directed to the discovery of methods for rendering and keeping it free from irritant impurities, which are produced in its preparation, and which in some cases are liable to be formed when it is kept in contact with air and exposed to light. It may be doubted whether the tests for purity laid down by the British Pharmacopœia are sufficiently stringent". It is worthy of note that the samples of ethanæsial examined in the course of this inquiry contained 95.5 per cent ether, 4 per cent n-butyl-alcohol, 0.5 per cent a mixture of ethyl alcohol and an aldehyde, and no ketones, the last being the constituent on which its originators stated that they relied for anæsthesia. Conclusions as to the value of pure ether coinciding with those of Dale are recorded by Stehle and Bourne² in America.

The bronchopulmonary complications following anæsthesia are of great importance, because they are in some degree or another not at all infrequent, and also they are generally put forward as the predominant argument against the use of ether, to which anæsthetic they are attributed more commonly than to others. As a matter of fact, it is at present quite unproved that ether is more liable to cause post-anæsthetic lung complications than other anæsthetics. The subject was debated in the British Medical Association.³ Dr. David Lamb pointed out the necessity of separating cases in which the lung trouble began within the first day or two after operation from those in which it arose later, when it was almost always due to sepsis. The most important contributory factor in the causation of bronchopulmonary complications Dr. Lamb held to be recent catarrhal affection of the upper air-passages prior to operation. There is no doubt that many of these complications could be avoided by additional care in the examination of patients before the administration of an anæsthetic. This is brought out, too, by observations made by A. I. Flemming.⁴ H. J. Paterson drew attention to the value of deep breathing both before and after operation as a preventive measure against lung complications. Dr. Featherstone had found "the incidence of pneumonia more marked after chloroform than after ether". Dr. K. B. Pinson, in a series of 4180 cases, found a morbidity-rate of 1.84 per cent, of which the proportion

of pneumonia to other complications was as 3 to 4. He was averse to methods of anæsthesia which involved rebreathing. Dr. Adams recommended the use of atropine after operation to combat chest complications.

In connection with the avoidance of intrathoracic troubles after anæsthesia, attention may be drawn to the *combined mask and airway* designed by Featherstone (Fig. 7). The author claims that by its use the risk of infection from nose or mouth is diminished.

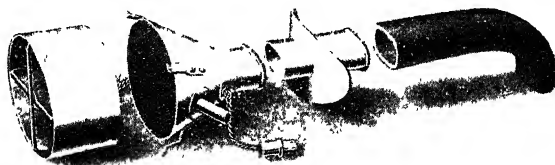


Fig. 7.—Featherstone's instrument, taken apart. (By kind permission of 'The Lancet'.)

Referring to the *effect of anæsthetics on the lungs*, R. J. S. McDowall⁵ states that experimentally his results agree with those demonstrated by Flemming on isolated tissues. Recovery from pulmonary effects occurs after ether, but after deep and prolonged anæsthesia with chloroform recovery is the exception. This observer states that "the actual death of tissue in the lungs as a result of the anæsthetic does not appear to be a remote possibility". Nevertheless, clinically there appears little evidence that such a result ever accrues. Probably to bring it about an excess of anæsthetic or a strength of vapour would have to be employed such as is unlikely to be used even by the least experienced administrator. McDowall points out that one function abolished by deep anæsthesia is that of the bronchioles, which limit the amount of air passing to the alveoli. The vagus does not cause bronchiole constriction under deep anæsthesia, the muscles or their nerve-supply being paralysed, perhaps by direct absorption of the anæsthetic through the mucous membrane. McDowall has shown that the action of adrenalin on the bronchioles may similarly be prevented by deep anæsthesia. The abolition of the bronchiole function must throw a greater strain on the alveoli, which may be exposed to particles that would not otherwise reach them. McDowall believes that the local effects of the commonly inhaled anæsthetics cannot be ignored.

Intravenous narcosis by means of isopral, normal saline, and ether is considered by H. Schmitzer,⁶ who gives a résumé of work hitherto done on this method. Induction in his procedure is performed by 100 c.c. of isopral in about seven minutes, after which ether solution of 5 or 7 per cent is infused in accordance with the requirements of the case. He has used as much as 2740 c.c. without causing œdema or any untoward symptom, but the number of cases reported on is only fourteen.

Ether in the expired air and in the tissues of those undergoing ether anæsthesia has been quantitatively analysed by Karl Gramén,⁷ of Stockholm. He finds that in about ten minutes the blood content of ether rises to about 80 mgrm. per cent, where it remains throughout the narcosis. Afterwards the content is reduced by 50 per cent in the first quarter of an hour; the rest takes about two days to disappear entirely. Gramén states that the suckling woman, if

operated on under ether, may put her baby to the breast within two hours of the end of the inhalation. He found almost invariably an increase of β -oxybutyric acid in the blood during narcosis, and ketonuria in 67.7 per cent of non-diabetics after it. Of these persons, 9.9 per cent had ketonuria before operation. Ether induces achylia according to this observer; out of 21 samples of matter vomited during narcosis, 15 gave a negative HCl reaction, and the remaining 6 but a faint one. Gramén believes in flushing the body with water a few hours before anæsthesia, and in avoiding preliminary purgation.

Pharyngeal insufflation is recommended by A. H. Miller⁸ for all those operations in which ordinary methods interfere with the work of the surgeon—i.e., head and neck and nose and throat operations. The advantage claimed over intratracheal insufflation is that no deep anæsthesia is needed for inserting the tube, and that the manipulations are easier. It is to be remembered that what amounts to intrapharyngeal insufflation can be, and often is, quite well carried out without special apparatus by using an airway, into the external opening of which a tube is inserted down which ether vapour is blown from a Shipway's apparatus or any other pumping apparatus which can deliver a uniform ether vapour. Even without an airway in some subjects, if the nose is plugged and the delivery tube inserted into the side of the mouth above the tongue, anæsthesia can be very satisfactorily maintained for operations of the kind above mentioned. Miller employs apparatus which keeps the ether vapour at a uniform warmth and percentage and regulates the pressure at which it is supplied, but it is doubtful whether these niceties do very materially improve the results.

Oil-ether colonic anæsthesia at the Richmond Hospital, Dublin, has proved satisfactory, owing, no doubt, to meticulous care in details of technique. The special points on which A. E. Boyd⁹ insists are: A weak mixture, 50 per cent ether and oil, so that the depth of anæsthesia can be easily controlled by oral addition as required; quiet during the induction, which is to occupy at least twenty minutes; an enema before the injection; and paraldehyde in addition to the mixture with difficult subjects. A preliminary hypodermic of morphine and atropine is given one hour before operation, and the injection started a quarter of an hour after the hypodermic. The amount of oil-ether mixture to use is estimated by the weight of the patient, one ounce being given for every twenty pounds, and eight ounces being regarded as the limit.

The ability of *light ether anæsthesia* to provide the proper state of the patient even in abdominal operations is insisted on by A. L. Flemming.¹⁰ It is a well-known fact that often rigidity is removed, not by deepening anæsthesia, but by lightening it and admitting more air to the patient. Cyanosis, indeed, is a common cause of want of relaxation, which is often attributed to deficient depth of narcosis. Flemming points out that, as regards shock, there is no evidence that it is better prevented by a deep than by a light narcosis. The contrary is, in fact, true, so long as the anæsthesia is complete. The potency of ether as a toxic agent is often disregarded, and undue amounts are admitted to the patient, with subsequent deleterious consequences.

Ethyl chloride for minor operations in children is extolled by S. F. Rose¹¹ as a result of his experience with 15,000 cases. These provided no fatality. The apparatus employed was a small rubber bag connected to a face-piece, a stop-cock intervening. Inside the bag is a clip holding a piece of sponge. Leading to this is a tube down which the ethyl chloride is sprayed. The dose employed is from 2 to 5 c.c. according to age; there is re-breathing and no air admission. The advantage of ethyl chloride as an anæsthetic for many dental operations was pressed by H. Hilliard¹² in a discussion at the Royal Society of Medicine.

Cardiovascular conditions in relation to anæsthesia were dealt with by Dr.

J. Strickland Goodall¹³ during a debate at the Royal Society of Medicine. He deprecated the fact that a physician would often give an opinion as to whether an anæsthetic could be taken without even knowing the nature or probable duration of the operation proposed. The proper preliminary examination of the cardiovascular system comprised examination of (1) the heart, (2) the vasomotor and vascular systems, (3) the respiratory pump. Whenever possible the patient should be examined standing, prone, and half reclining. In thyroid cases the two chief kinds of heart were the pneumo-mechanical and the toxic heart met with in Graves' disease. In the latter disease the blood-pressure passed through three phases: an initial rise, followed by a 10 to 20 per cent drop, then a further rise. If operation were done after the first rise the blood-pressure rose, and this was the stage at which the patient was in trouble.

A study of *arterial blood-pressure with different anæsthetics*, carried out at the Hospital Provincial, Madrid,¹⁴ gives a résumé of previous work and the details of the author's cases; there were 46 chloroform, 4 ether, 15 mixture of these two, 15 spinal, and 19 local. The experience with chloroform confirmed the usual opinion that this drug causes a frank fall in arterial blood-pressure, though the authors do not regard the anæsthetic as the sole cause of the fall. With local anæsthetics they found either very slight variation or else a rise of pressure. Spinal anæsthesia was accompanied by a fall in both systolic and diastolic pressures. Incision of the peritoneum was found to be associated with a fall in arterial pressure.

An article on *nitrous-oxide-oxygen analgesia and anæsthesia with rebreathing in obstetrics* makes it plain that this method cannot be certain of success unless one man is entirely given up to the anæsthetic. The author is the obstetrician and also superintends the anæsthetic, either giving one hand to his machine or leaving this to the nurse, who acts under his instructions. In 238 cases there were 11 patients who are recorded as having 'no relief from pain', and for 39 ether was necessary. The advantages of using 'gas and oxygen' for labour may in certain cases outweigh the very considerable inconveniences, but they can never do so unless the administration is solely in the hands of an experienced anæsthetist. With no other method is failure so easy. The author contends that the period of labour is shortened by 'gas and oxygen' as compared either with other general anæsthetics or with 'twilight sleep'. 'Gas and oxygen' in association with local anæsthetics is recommended for Cæsarean section,¹⁵ and there is no doubt that when this operation is required for a toxæmic condition the method has much to recommend it in preference to ether or chloroform. For heart cases it is probably more dangerous than ether. The excellent results obtainable from 'gas and oxygen' in obstetric cases if the anæsthetic is in skilled hands are related by Bourne and Duncan.

Urinary determinations and anæsthetic risk have formed the subject of an inquiry made by Clifford Mitchell,¹⁶ who investigated several thousands of specimens taken from unselected patients. The extra risk of anæsthetics to toxæmic patients is well established, and the nature and extent of the toxæmia may be best demonstrated in some cases by urinary investigation. The author maintains that if the individual is normal there is a balance between the specific gravity of the urine and the acidity, urea, and indican. He tests the urine from two supplies, the first resulting from twenty-four hours during which the patient takes not more than two pints of liquid; the second from the twenty-four hours directly following, during which the patient drinks not less than four pints. The specific gravity of the first variety should not be below 1020; if it is, there is the suggestion of poor kidney function for water. If from the second variety the specific gravity is much over 1020, the suggestion is that

there is obstruction to the renal circulation, as in passive congestion of the kidney. For the urea determinations and chemical tests the reader is referred to the article itself.

Ethylene has been used as an anæsthetic, after experimental work by Luckhardt and Carter.¹⁷ These observers tried the gas on various animals, and then on themselves and colleagues. They concluded that anæsthesia with ethylene can be maintained without asphyxia, effect on blood-pressure, or dyspnoea, and with complete muscular relaxation. At a concentration of 80 per cent of ethylene complete analgesia could be produced. There is rapid recovery after long administration without evidence of after-effects. One hundred and six patients have been operated on during an ethylene anæsthesia. The patients' ages ranged from 10 to 64 years, and they were of both sexes. The operations included abdominal sections and operations on the head, thorax, and perineum; ethylene was also used in obstetrics. The average length of 92 operations was 27·8 minutes. In no case was recovery of consciousness later than five minutes after discontinuing the administration. After short operations recovery was almost immediate. Three out of 92 patients felt sick, and 14 vomited; vomiting was never serious or long lasting. Two failures are recorded. In one a concentration of 90 to 95 per cent of ethylene produced marked cyanosis without the slightest relaxation; the other patient was made analgesic by a 95 per cent ethylene-oxygen mixture, but was never deeply anæsthetized. From these cases and from the reports of others it may be gathered that the potency of ethylene and oxygen, in mixtures which keep the patient in good colour, is more to be compared with that of nitrous oxide and oxygen than with that of ether or chloroform. This is suggested also by the rapid recovery. Nevertheless the relaxing power of ethylene and oxygen appears to be greater than that of 'gas and oxygen', so far as can be judged from the as yet comparatively small number of cases recorded. Ethylene is, of course, an inflammatory gas, and in the proportion of 4 per cent with air it provides an explosive mixture. Care is necessary, therefore, in its use, and it must not be given near the cautery, an open fire, or electric sparks.

Acetylene (C_2H_2) has also been tried recently as an anæsthetic, and appears to give results not unlike those obtained from ethylene. Both gases are administered with a large percentage of oxygen from cylinders like those employed for nitrous oxide. Acetylene is even more inflammable than ethylene. Also its odour is so unpleasant that it has to be disguised to make the gas easily respirable. Under the name *narcylen*, Gauss,¹⁸ of Freiburg, has been using a mixture of purified acetylene, oxygen, and oil of pine. The results are reported as highly satisfactory, but the patients appear to have been all women, and it is probable that the narcosis was less profound than is required by most operators in this country.

Although *electric narcosis* has actually been induced since Leduc first produced electric sleep by an interrupted current, the practical utility of the method is as far away to-day as it was then. An elaborate series of experiments on animals by von Neergaard¹⁹ led him to the conclusion that as yet the experimental basis is not sufficiently well founded to justify attempts on human beings. When the method has been employed on human beings the induction stage is described as being longer and more unpleasant than with chloroform.

Stimulation of the cutaneous nerves with a unipolar electrode, a method used by Hughson²⁰ for teaching the distribution of cutaneous nerves, has been applied with great advantage to the use of local anæsthetics. The point of emergence of the cutaneous nerve from the deep fascia, and the subsequent course, can be easily identified; the area of distribution is outlined by the

tingling sensation caused by the stimulation. Thus the injection of the local anæsthetic can be most accurately made, and small quantities are rendered efficient.

A new local anæsthetic, with the stupendous name chlorhydrate paramino-benzophthaleinate of ethyl, is described by Lecerf²¹ as being superior to all others in its lack of toxicity and its efficiency in destroying sensibility. It has been used by the infiltration method, and is said to cause no œdema in the tissues injected.

In a study of arterial pressure during spinal anæsthesia, Abadie and Montero²² confirm the opinion that this method entails a lowering of the blood-pressure. The most efficient corrective they find to be the head-down position. Caffeine is also an effective antidote, but should be given, they maintain, two or three hours before the spinal puncture, instead of as a corrective when the pressure has fallen.

Caffeine has replaced strychnine in the solution which Jonnesco²³ now uses, and with which he states that the results for high and low injections are so completely satisfactory that this method of anæsthesia should be the first chosen for any operation in any part of the body. The solution consists of stovaine, 2 to 5 cgrm. for high, and 2 to 10 cgrm. for low injection, with 50 cgrm. caffeine.

The value of *butyn* as a local anæsthetic is demonstrated by W. M. Beaumont.²⁴ In eye operations and nose, ear, and throat work he has used 2 per cent and 5 per cent solutions with perfect success. Butyn is probably less than half as toxic as cocaine, and is more efficient as an anæsthetic. It has no constricting power and is not a mydriatic. It has been freely used in America, with so far no report of any toxic effect. (See also INTRACARDIAC INJECTIONS.)

REFERENCES.—¹*Lancet* 1923, i, 424; ²*Jour. Amer. Med. Assoc.* 1922, July 29, 375; ³*Lancet*, 1922, ii, 518; ⁴*Proc. Roy. Soc. Med.* 1923, June, 108; ⁵*Brit. Med. Jour.* 1923, i, 61; ⁶*Munch. med. Woch.* 1923, March 2, 270; ⁷*Supplement to Acta Chir. Scand.* 1922, 146; ⁸*Jour. Amer. Med. Assoc.* 1922, Aug. 5, 441; ⁹*Irish Jour. Med. Sci.* 1922, Dec., 472; ¹⁰*Bristol Med.-Chir. Jour.* 1923, March, 88; ¹¹*Lancet*, 1923, i, 1258; ¹²*Proc. Roy. Soc. Med.* xvi, No. 8; ¹³*Lancet*, 1923, i, 284; ¹⁴*Rev. Españ. de Cir.* 1922, Aug., 344; ¹⁵*Current Researches in Anæsthesia*, 1922, Aug.; ¹⁶*Ibid.* 23; ¹⁷*Jour. Amer. Med. Assoc.* 1923, May 19, 1440; ¹⁸*Prescriber*, 1923, July, 249; ¹⁹*Arch. f. klin. Chir.* 1922, Nov. 30, 100; ²⁰*Johns Hop. Hosp. Bull.* 1922, Sept., 338; ²¹*Presse méd.* 1923, May 30, 486; ²²*Ibid.* 1922, Sept. 13, 786; ²³*Ibid.* Oct. 28, 929; ²⁴*Brit. Med. Jour.* 1923, i, 57.

ANAPHYLAXIS. (See SERUM SICKNESS.)

ANEURYSM.

Sir W. I. de C. Wheeler, F.R.C.S.I.

Ligature of the First Stage of the Left Subclavian Artery from behind.—A. K. Henry¹ suggests an excellent method of approach to this artery by the posterior route. The anterior approach to the left subclavian is notoriously difficult; a formidable array of nerves and vessels screen the artery. Through these but narrow access is gained, even after resection of the inner end of the clavicle, the first rib cartilage, and part of the manubrium. In actual practice, too, the upward bulge of an aneurysm into the neck will not simplify the surgeon's task. The posterior route has the merit of simplicity, and surgery advances through simplification to security. The author describes the route upon which he chanced: The transverse process of the second dorsal vertebra, and three inches of the second rib measured from its head, were removed from the left chest of a hunchbacked cadaver after carefully separating the rib from the parietal pleura. In effecting this separation the pleural dome was slightly depressed, and the first stage of the left subclavian artery appeared in the field. Further separation and depression of the pleura exposed the artery

from its point of origin at the aortic arch to the first rib, and definition of all its branches except the thyrocervical trunk was easy. These structures were rendered surprisingly superficial by the kyphotic deformity of the back. Examination of normal subjects showed that in them the left subclavian artery and its branches are further from the dorsal surface of the trunk. The first stage of the artery, however, is just as easily tied in spite of the depth at which it lies, for once the lung and pleura have been depressed, the artery, except for a delicate sheath, lies naked in the thoracic cavity, and is immediately accessible. There is no barrier of vein or nerve: the vessel is directly under the finger. With a suitable needle it is easy to pass a ligature round the artery, and this was done by students who had never previously tied any vessel in the body.

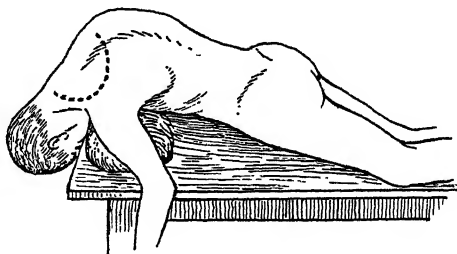


Fig. 8.—Showing skin incision and position securing maximum abduction of the scapula.

Fig. 8 shows the position of the patient at operation, and the skin incision.

REFERENCE.—¹*Brit. Jour. Surg.* 1923, Jan., 367.

ANEURYSMS, ACUTE INFECTIVE. (See also ENDOCARDITIS LENTA.)

Drs. C. Lian and L. Pollet.

(Translated by Cwely F. Coombs, M.D., F.R.C.P.)

ETIOLOGY.—It is usual to regard as syphilitic practically all aortic aneurysms, and indeed all arterial aneurysms, except those that are traumatic. Nevertheless, it must be recognized that acute infections can cause arterial aneurysms, and even aneurysm of the aorta. Thus Stengel and Wolferth,¹ describing four personal experiences, have collected from the literature 217 observations of aneurysms which were neither syphilitic nor traumatic. These aneurysms usually complicate endocarditis, in particular endocarditis lenta,² and sometimes the more acute forms of malignant endocarditis, but they are very unusual in connection with acute articular rheumatism alone.

Other rare causes are infections of the lungs (pneumonia 10, septic infections 3), and of the bones (osteomyelitis 6). Very rarely other infective diseases may be the cause. It appears that the organism most often responsible is the *Streptococcus viridans*, so often the cause of endocarditis lenta; much more rarely the pneumococcus, staphylococcus, and gonococcus. When these organisms attack the arterial wall, they are carried there either by a large clot filling the channel of the vessel, or by quite small clots obliterating the vasa vasorum, or again by the blood-current, or, finally, by infective lesions which spread from the aortic or pulmonary valves by direct extension. (Plate I.) There is no definite proof of a purely mechanical origin of aneurysm complicating embolism caused by a non-infective clot.

SYMPTOMS AND DIAGNOSIS.—

Arteries of the Limbs (54 cases).—As a rule, the first signs are those of arterial obliteration of sudden onset, traceable to embolism the more readily because the patient is usually already under treatment for malignant endocarditis. Several days later the pulsating aneurysmal swelling becomes visible. Sometimes, however, the embolism escapes notice, and then it is sharp pain which first attracts the practitioner's attention. In one case observed by us, the aneurysm

of the brachial artery at the bend of the elbow arose as a complication of a case of malignant endocarditis not long after the blood had been taken for cultivation. The specimen had been difficult to secure; the needle had been introduced several times, and it is possible that the artery may have been thus injured and predisposed to the formation of the aneurysm. These aneurysms may reach the size of an egg; but in general they are small, and at all events do not appear bulky, because they are surrounded by inflammatory tissue, or by extravasated blood due to a small rupture. They may end in rupture, sometimes rapidly at the end of a week or two; in other cases they remain stationary or even regress.

Aorta (66 cases); *Pulmonary Artery* (6 cases); *Abdominal Arteries* (63 cases); *Cerebral Arteries* (34 cases).—As a rule the aneurysms are so small that a clinical diagnosis is rarely possible, and as a rule they are not discovered until autopsy. However, a number of cases have been reported, particularly in France, where a clinical diagnosis of rheumatic aneurysm of the aorta has been regarded as possible. At autopsy they are hardly ever found to exceed the size of a hazelnut, so that they are much smaller than syphilitic aneurysms. Further, to the naked eye, the artery seems normal outside the aneurysm. This sudden transition from aneurysm to healthy tissue is also different from what is seen in syphilitic aneurysms.

DESCRIPTION OF PLATE I.

Fig. A.—Drawing of wall of left ventricle, aortic valves, and the aorta just above the valves. There are two long ragged vegetations on the right posterior aortic leaflet. Above each on the inner surface of the aorta is an ulceration (*u*) to which the free end of the corresponding vegetation extends. The aneurysm (*a*) is above the anterior leaflet. The mouth of the right coronary artery at the lower end of the aneurysm is concealed, but the vessel is patulous.

Fig. B.—Low-power magnification photomicrograph of section of the entire length of the aneurysm, stained for elastic tissue. At the edges of the aneurysm the elastic fibres are suddenly curved outward and soon lost. At the base of the out-pouching small remnants of elastic and muscular fibres can still be recognized.

TREATMENT.—This is dominated by the fatal outlook of the condition which is most often the cause—namely, endocarditis lenta. As a consequence, treatment is only palliative, and consists in local applications to relieve pain. Surgical treatment is only indicated where the aneurysm enlarges so rapidly that it threatens to burst.

REFERENCES.—¹*Arch. of Internal Med.* 1923, April; ²*See Med. Annual*, 1921, 182.

ANGINA PECTORIS.

Drs. C. Lian and L. Pollet.

(Translated by *Carey F. Coombs, M.D., F.R.C.P.*)

PROGNOSIS.—Generally after an attack of angina pectoris the arterial pressure remains practically the same as it was before. A sudden fall of arterial pressure is a sign of the utmost gravity in persons with a high tension, as Vaquez has shown, and Lutembacher¹ also concludes that a big drop in the arterial pressure after an attack of angina implies a fatal prognosis. In severe forms, where death has been observed to follow, for example, a drop from 250 to 90 mm. Hg systolic; there have also been noticed great rapidity of pulse, weak and unequal heart beats, and cessation of pain, which gives place to a feeling of suffocation.

Blackhall-Morison² has stated in a recent paper that he also has proclaimed the same opinion since 1921. Two cases reported by him, the pressure falling in the one from 150 to 95, and in the other from 135 to 80, show a wide fall of

PLATE I.

ACUTE INFECTIVE AORTIC ANEURYSM



Fig. A.

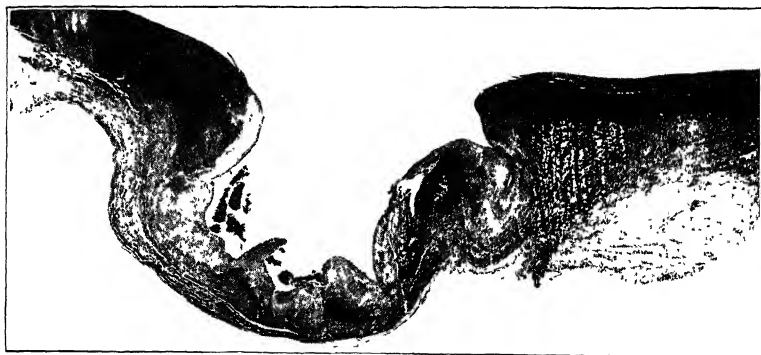


Fig. B.

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pressure as of fatal import, even if, as in his two cases, the patient's other symptoms are by no means disquieting—good sleep, good appetite, dyspnoea not great, pulse regular at 80. Death occurred twelve days after the attack in one case, and the day following the attack in the other.

SURGICAL TREATMENT.—

Excision of the Left Cervical Sympathetic.—As is well known, Jonnesco³ twice resected the left cervical sympathetic for the relief of angina pectoris, with success. The purpose of the operation is to interrupt the transmission of afferent impulses from the cardio-aortic plexuses, and thus to suppress the painful sensations of the anginal attack. Perhaps also it might suppress the inhibitor reflex that causes sudden death. Our conclusion as to this new proposal in *L'Année Médicale Pratique* of 1922, p. 32, was that the remarkable results obtained in these two cases demand close attention. Since that time the number of cases treated has increased, so that this operation takes a definite place in the surgical treatment of severe angina. Jonnesco⁴ removes the left cervical sympathetic chain, including the superior middle and inferior cervical ganglia and the superior thoracic ganglion, under spinal anaesthesia. If necessary, the same operation may be practised later on the right side. His experience now includes 6 cases, 4 of them patients with hearts well enough to admit of a reasonable chance of survival; 3 have remained cured for seven years, two and a half years, and one and a half years respectively. The fourth died at the end of eight months, but in his case it had been impossible to perform the complete operation. Two other patients with signs of cardiac failure recovered from the operation but succumbed quickly to the cardiac lesion. To these we have to add the case of a man relieved by Tuffier⁵ of anginal attacks, dying several months later of an accidental pulmonary lesion; Brüning's⁶ case: a woman of 50, whose attacks were so severe and frequent that she attempted suicide; after the operation the attacks disappeared completely, and the arterial tension fell from 240 to 190 mm. Hg; and, finally, the five cases of Coffey and Brown,⁷ whose operation, sparing the superior cervical ganglion, obtained the following results: Complete cessation of attacks in two cases, one case with a mild attack a month after operation, in which they proposed to perform a further operation on the right side, one case with persistent attacks of pain in the left forearm, and one case of death six hours after operation.

Danielopolu⁸ has sharply criticized the operation because it gets rid of the efferent cardiac fibres of the sympathetic and the vasomotor nerves of the pulmonary and coronary vessels. But to these theoretical considerations Jonnesco⁹ replies with statements of fact, to the effect that he has practised bilateral resection of the cervical sympathetic in about 200 patients (cases of epilepsy, thyroid disease, etc.), and he has never seen any cardiac complications, even though certain of his patients have been watched for twenty years following the operation.

Section of, or Injection of Alcohol into, certain of the Spinal Nerves on the Left Side.—Danielopolu succeeded in abolishing for some hours anginal crises by injecting 8 cgrm. of novocain over the intercostal course of the 2nd and 3rd left dorsal nerves, distal to the rami communicantes. This observation led him to propose a section of the left spinal nerves corresponding to the cutaneous area in which the pain of angina spreads. This has been done only once, and then incompletely, by Hristide on a patient of Danielopolu's. Operating under local anaesthesia with novocain, he was interrupted after resection of the 2nd dorsal nerve by a violent anginal bout. The attacks, which had been occurring freely before the operation, occurred no more, but the patient went rapidly downhill and died of asystole, which, as is well known, may of itself cause the

attacks to disappear. Danielopolu has discussed the possibility of the injections of alcohol into the nerves instead of resecting them.

REFERENCES.—¹*Presse méd.* 1921, Jan. 5; ²*N. Y. Med. Jour.* 1923, May 2; ³*Bull. de l'Acad. de Méd.* 1920, Oct. 5, and 1921, July 19 and Oct. 25; ⁴*Presse méd.* 1922, April 26; ⁵*Bull. de l'Acad. de Méd.* 1923, Oct. 16; ⁶*Klin. Woch.* 1923, April 23; ⁷*Arch. of Internal Med.* 1923, Feb., and *Jour. Amer. Med. Assoc.* 1923, June 9; ⁸*Bull. Soc. Med. Hôp. de Paris*, 1923, Jan. 2 and June 1; ⁹*Presse méd.* 1923, June 9.

ANGIONEUROTIC ŒDEMA. (See URTICARIA.)

ANKYLOSTOMIASIS.

Sir Leonard Rogers, M.D., F.R.C.P., F.R.S.

DISTRIBUTION.—The Rockefeller Foundation¹ describe the incidence of hookworm infection in India based on existing records, and show it to be heavy in Assam, Bengal, East and Central Madras, and Ceylon, medium in the United Provinces, but only light surface infection in Burma and North-West India. No systematic effort has yet been made to deal with the problem.

R. M. Gordon² has examined the ankylostomes obtained from 67 post-mortems in the Amazonas State of Brazil, and found they could nearly all be recognized by means of a hand lens as *Necator americanus*, as compared with *A. duodenale*, by the general fineness and the sharply-defined head curve; the proportion of *A. duodenale* to *N. americanus* in Amazonas was 1 to 4·7, against 1 to 4·5 recorded by Darling in South Brazil, and the number of both forms together per case being 102·3 to 136·1, showing a high rate of infection which was nearly the same in town as in country dwellers. Four *A. braziliense* were found among 6857 worms, while this species was also found in dogs and cats, and he was unable to confirm the differences of this worm from *A. ceylanicum* which have been described by Faria and Clayton Lane. C. A. Kofoid³ found 15·5 per cent of 19,640 army recruits in the United States infected with hookworm, the proportion varying from 17 per cent in the Southern States to 0·84 per cent in the North-eastern area.

DIAGNOSIS.—K. S. Mhaskar⁴ discusses the diagnosis of hookworm infection, for which purpose he regards examinations of the faeces for ova as the only method of value. He reports careful comparative tests by fifteen different recorded methods. Barber's flotation method, in which the material is stirred up on a slide with as much of a mixture of equal parts of glycerin and saturated brine solution, or (better) magnesium sulphate, as it will hold, and the upper convex surface of the film examined for the ova which are found there free from faecal matter, gave 100·6 per cent of the standard centrifuge method by searching a single slide instead of ten in the latter plan, so is 'simple, practicable, rapid, and accurate'. Further experiments showed that by modifying Barber's method by adding to equal parts of glycerin and saturated magnesium sulphate 5 per cent of saturated gum-acacia solution, the surface of the film is steadier for examination and keeps twenty-four hours without drying, furnishing the best method for use, a centrifuge being unnecessary if the suspension of faeces in water is allowed to stand thirty minutes after passing through a wire gauze of 40 meshes to the inch; with the help of a coolie and a fairly trained assistant one can examine 125 samples in a five-hour-day's work.

J. B. McVail⁵ notes that when ankylostomiasis is complicated with malaria the eosinophil count was only 11 per cent, and with kala-azar only 1·7 per cent, against 19·3 per cent in simple hookworm infections.

HOOKWORM CONTROL.—D. L. Sisco⁶ deals with the prevalence of hookworm disease among persons who have been cured five years before in Antigua during a treatment campaign, a re-survey having recently been made. During 1915-17 2229 persons, or 29·8 per cent of those examined, were found infected, and 1972 were cured as far as microscopical examinations could show; and in the

re-survey 1234, or 62.6 per cent of them, were re-examined by the same method, and 262, or 21.2 per cent, found to be infected, while 78.8 per cent showed no evidence of recurrence of the disease, although rural sanitation and hygiene remain of a very primitive type; it is therefore considered that "this cannot be said to be an unfavourable result"; hæmoglobin estimations showed the degree of anæmia to be no greater in the infected than in the uninfected persons, indicating only slight infections being now present. This is in agreement with the work of Smillie in Brazil, who showed that although the hookworm infection-rate was almost exactly the same after four years of hookworm prophylaxis as before, the average number of hookworms numbered only 14 (against 136 per head found by Darling in South Brazil), "a number too small to cause symptoms", indicating the necessity of differentiating between 'hookworm infection' of a harmless degree and actual 'hookworm disease'. This work also indicates the advisability, whenever possible, of improving the sanitation of a district before carrying out a hookworm curative campaign.

S. T. Darling⁷ has published a paper on "The Hookworm Index and Mass Treatment", which is likely to mark an important advance in practical measures against this widespread and debilitating disease. He points out that we have been thinking too much in terms of 'percentage of persons positive for ova', rather than of the number of hookworms in the infected person and of larvæ infesting the soil; this can only be determined by ascertaining the average worm count, or index, of men, which reached from 235 to 378 in Java and 228 in Brazil, while with only 28 per cent freed from worms by the first treatment 90 per cent of the worms had been removed, and with only 49 per cent cured by two treatments no less than 97 per cent of the worms had been expelled; microscopical examinations for ova may thus be most misleading. In agricultural districts from 90 to 100 per cent of the people have been found infected by the administration of vermifuges to a certain number and counting the worms expelled. The administration of effective treatment to all the people, without spending valuable time in stool examinations, will remove most of the worms, reducing them to a minimum, and so greatly reducing soil infestation that only the lighter infections can result, such a mass attack on the infection being the most effective and rapid method of reducing the scourge. In Java the hookworm survey was made entirely by the method of diagnosis by vermicide and worm count, which gave much more important information as to the amount of infection than could be obtained by microscopical examinations of the stools. With sufficiently large numbers of cases the amount of anæmia was in proportion to the number of worms found, the loss of hæmoglobin being in proportion to 1 per cent for each 11 to 12 worms. In children there is a gradual increase in the worm index with increasing age, indicating a slowly augmented infection, which was about 12 worms a year after the first year of life in both agricultural Java and in Malay rubber estates; but in the city of Batavia only 2.5 up to the ninth year, and among imported plantation coolies 2 to 3 for each year of service, this being the net gain after deducting loss of old worms from newly-acquired ones. If the soil infection is rapidly reduced by mass treatment, the soil infection and new worms acquired will also fall rapidly.

The recent work of Baermann in Java and of Cort in Trinidad indicates that the duration of the life of larvæ in soil is limited to about six weeks, so when that time has elapsed after a mass reduction of the infection of the soil by mass treatment, new infections will rapidly fall; if, therefore, all the people in a heavily infected community are treated within a few days, the worm index and soil infestation may quickly be reduced to a far less dangerous level and

may remain so permanently. A reduction of the worm index by 90 per cent within six days in a community of several thousand people is quite feasible and has repeatedly been effected in Java, and work on similar effective lines is being carried out in Ceylon and Brazil, where from 85 to 99 per cent of people have been found infected. The above views of Darling are illustrated by curves in a paper by W. W. Cort.⁸

TREATMENT.—Important work establishing the advantages of the new Carbon Tetrachloride treatment of hookworm has also appeared recently. M. C. Hall,⁹ the discoverer of its value as the result of its trial in dogs, urging its advantages as an easily standardized cheap chemical, not requiring a purgative, and more effective and safe than previous methods. It is given in doses of 3 c.c. for a man, and it can conveniently be combined with oil of chenopodium or thymol to act on ascarids as well. S. M. Lambert^{10, 11} reports on 50,000 cases treated with carbon tetrachloride in Fiji with no toxic symptoms in the first 42,000; in the last 8000, however, in which a different sample, sold as pure but afterwards found to be impure, was used, three deaths occurred with symptoms of coma and fatty degeneration of the liver post mortem. Infestations of from 89 to 93 per cent were found in Fijians and Indians respectively, and a single treatment cleared up 91 per cent, the cost of each treatment working out at fourpence halfpenny. The dose used was 0.2 c.c. (3 min.) for each year of age up to 15 years, and 3 to 4 c.c. in adults, being given in a tablespoon or small glass after being covered with water. It is nearly tasteless and not objected to, slight symptoms of headache or nausea being easily prevented by a dose of magnesium sulphate three hours after the drug, and alcohol prohibited for several hours. It is not very effective against ascarids, only 40 per cent being removed. Clinically the standard of health of the treated persons was immediately raised, so it appears to be eminently suitable for mass treatment, while hundreds of pregnant women have taken the drug without the occurrence of any abortions. Oil of chenopodium may be added if ascarids are numerous. Smillie and Pessoa¹² also found this drug very efficient in Brazil, a single treatment of 3 c.c. removing 95 per cent of hookworms; larger doses are unnecessary, and may be dangerous, with symptoms resembling those of chloroform poisoning, namely dizziness, headache, somnolence, and slight nausea, and rarely fatty liver, which is seldom fatal; alcoholics are especially susceptible, 1.5 c.c. having produced toxic signs in an acute alcoholic. G. G. Hampton,¹³ in Ceylon, has given from 3 to 10 c.c. doses of carbon tetrachloride, including 6 c.c. to a condemned prisoner, whose bowels were free from hookworms post mortem, while microscopical examinations of the stools of the other cases ten days later showed 90 per cent cured. J. F. Docherty and E. Burgess¹⁴ report the results of administering 3 c.c. carbon tetrachloride in one condemned prisoner and 5 c.c. in two others with their consent; post mortems six to fourteen days later showed no change in the liver after the 3-c.c. dose, but there was granular degeneration in one and fatty degeneration of the liver cells in the other man, who took 5-c.c. doses, although all three were given a purge three and a half to six hours after the drug. This indicates that 3 c.c. is about the limit for a safe dose.

J. F. Caius and K. S. Mhaskar¹⁵ report on the anthelmintic properties of Propenylphenols, which they find to be well marked both as vermifuges and vermicides, including Oil of Cloves in 60-min. doses, which acts on hookworms and oxyuris, but not on ascarids and trichiuris; Eugenol in 90-min. doses is active against hookworm alone; Oleum Sassafras in 60-min. doses is not toxic and is a fairly good vermicide; while Oleum Anisi in 60-min. doses proved a fairly good vermicide but a poor vermifuge.

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Parasitol. 1922, July, 223; ³*Amer. Jour. Trop. Med.* 1922, Sept., 389; ⁴*Ind. Jour. Med. Research*, 1923, Jan., 665; ⁵*Ind. Med. Gaz.* 1922, Oct., 366; ⁶*Jour. Amer. Med. Assoc.* 1923, Feb. 17, 45; ⁷*Amer. Jour. Trop. Med.* 1922, Sept., 397; ⁸*Ibid.* 449; ⁹*Ibid.* 373; ¹⁰*Jour. Amer. Med. Assoc.* 1923, Feb. 24, 526; ¹¹*Ibid.* 1922, Dec. 16, 2055; ¹²*Amer. Jour. Hyg.* 1923, Jan., 35; ¹³*Amer. Jour. Trop. Dis.* 1922, Sept., 381; ¹⁴*Brit. Med. Jour.* 1922, ii, 907; ¹⁵*Ind. Jour. Med. Research*, 1922, Oct., 343.

ANTHRAX.

Herbert French, M.D., F.R.C.P.

TREATMENT.—Louw and Pijper¹ give a very striking series of 11 cases of anthrax treated by intravenous injection of **Salvarsan** or **Neosalvarsan**. The diagnosis was made by bacteriological examination, and anthrax bacilli were grown from the sores in ten out of the eleven cases. In the other case the cultures were negative, but clinically there was little doubt as to the condition. All eleven cases recovered, and recovery was remarkably rapid, œdema decreasing and pain lessening within twenty-four hours after the first injection. They give notes of all the cases, but it is sufficient here to reproduce two.

Case 4.—Farmer, age 45. Malignant pustule on wrist, with redness and swelling up to elbow. Admitted Nov. 19, 1921; Nov. 19, neosalvarsan 0.9; Nov. 20, neosalvarsan 0.9; Nov. 21, neosalvarsan 0.9; Nov. 28, neosalvarsan 0.9; Nov. 29, discharged cured.

Case 6.—Laboratory attendant, infected whilst working with anthrax culture. Extensive lesion of lower lip, extensive œdema of left cheek and neck; condition exceedingly bad. Delirious, pulse 152, life despaired of. Admitted Dec. 14, 1921; Dec. 14, neosalvarsan 0.6; Dec. 16, neosalvarsan 0.9; Dec. 18, neosalvarsan, 0.9; Dec. 21, discharged cured.

The local treatment consisted only in the application of mild wet antiseptic dressings.

REFERENCE.—¹*S. Afric. Med. Record*, 1922, July 22, 273.

AORTITIS.

Drs. C. Lian and R. Barrieu.

(Translated by Carey F. Coombs, M.D., F.R.C.P.)

DIAGNOSIS.—Not seldom radiographic examination discovers aortitis which cannot be diagnosed by the most careful clinical examination. A good radiological examination of the aorta should determine: (1) Its dimensions; (2) Its degree of opacity; (3) The excursion of its pulsations.

1. *Dimensions.*—The diameter of the ascending portion of the aortic arch can only be measured in the oblique position (right anterior and left anterior). This fact emerges clearly from the recent work of Delherm and Chaperon,¹ for the shadow of the vascular pedicle of the heart in the antero-posterior position is composed, from right to left, of the superior vena cava, aorta, and the pulmonary artery. Tables by Vaquez and Bordet² have defined the diameter of the ascending aorta in the oblique positions. As a ready aid to memory it may be remarked that the figure of 3 cm. is abnormal in adult life, but normal after 50 years.

2. *Degree of Opacity.*—According to Vaquez and Bordet, the normal aortic shadow is grey, not as deep as the left ventricle in the adult, but sometimes reaching the same degree of opacity as the cardiac shadow in old persons. But since it is difficult to appreciate at a glance fine grades of opacity, they propose to estimate the degree of aortic visibility as starting from this basis, that in the frontal position the descending aorta cannot normally be seen, while in the oblique positions only the ascending aorta can be seen. Any increase upon either of these proves that the aortic opacity is increased. Three degrees of increased opacity are distinguishable by this means: (1) When the first portion of the descending aorta is visible in the frontal position; in such cases the transverse aorta is usually visible in the left anterior oblique position.

(2) The transverse aorta can be clearly seen as far as the vertebral column, the first part of the descending aorta obscuring the clear space seen in the left posterior oblique position. (3) The transverse course of the aorta is seen in all positions, and especially in the right anterior oblique, the upper edge of the transverse arch being visible against the shadow of the vertebrae in the frontal position. Vaquez and Bordet have shown that aortitis may be diagnosed on an increase of opacity even where the aorta is not enlarged. Recently, Lecointe,³ publishing Vaquez's statistics of aortitis, found that in a quarter of the cases radiographic diagnosis rested solely on the increase in opacity.

3. *The Amplitude of the Aortic Excursion.*—Vaquez and Bordet had already noted that in many cases of aortitis the aortic pulsation was feeble. Mougeot⁴ has recently insisted upon the value of comparing these amplitudes with the relation between the systolic and diastolic arterial pressures. If these are parallel he concludes that the diagnosis of aortitis may be set aside, even if the aorta is dilated; on the other hand, if feebleness of the beats coincides with a wide swing of the arterial pressure, he concludes that aortitis is present. This idea is interesting, but difficult to apply, for, except in extreme cases, it is difficult to appreciate whether or no there is a parallelism between the aortic excursion and the swing of the arterial pressure.

REFERENCES.—¹*Presse méd.* 1922, April 26; ²*Radiologie des Vaisseaux de la Base du Cœur*, Baillière, Paris, 1922; ³*Presse méd.* 1923, May 23; ⁴*Ibid.* June 6.

APPENDIX, SURGERY OF.

E. Wyllys Andrews, M.D., F.A.C.S.

Primary Carcinoma of the Appendix.—Perry¹ describes two cases with very similar histories. Both had had recurrent attacks of what was diagnosed as mild appendicitis, and both continued to have a slight amount of abdominal pain. This closely simulated the so-called chronic appendicitis. Operation was undertaken in each case with no suspicion of any malignancy being present. The organs were found to be free from adhesions, hard and indurated, but there was no gross evidence that anything but a chronic inflammatory process was present. In neither case were any enlarged glands noted. It was only on microscopic examination that the cancer was noted. One case died later from recurrences, and the other was lost track of. Warwick² has a communication on the same subject. His conclusions are that these cases are very likely to be overlooked at the first operation unless a microscopic examination is done as a routine. A tiny growth will cause obstruction of the lumen or act as an atrium for infection, and attacks of acute appendicitis will result. The appendix is often removed to cure these before the disease has progressed enough to be noticed until the appendix is cut open and carefully examined. He states that from 0.2 to 0.8 per cent of removed appendices will show definite malignancy under the microscope.

Acute Appendicitis.—Love³ has summarized 1503 cases of acute appendicitis in the London Hospital in the last three years.

In the first place it is shown that the cases seen early and operated on at once have by far the best chance. Here the mortality was only 0.57 per cent.

In cases seen in a later stage of the disease, operation was postponed in 228 and temporary medical management instituted. In 151 of these medical measures were successful in tiding the patient over until a more quiescent period, when the mortality was 1.9 per cent; 77 cases failed to respond to such palliative measures and got worse instead of better, and operation was undertaken at the end of twenty-four hours' waiting, with a mortality of 6.5 per cent. The crux of the matter is: "Did this delay jeopardize the patients' chances of recovery?" Love's statistics show definitely that it did not. The total mortality in all cases where operation was delayed was 3.5 per cent. The total mortality

PLATE II.

APPENDICITIS

(R. J. McNEILL LOVE.)

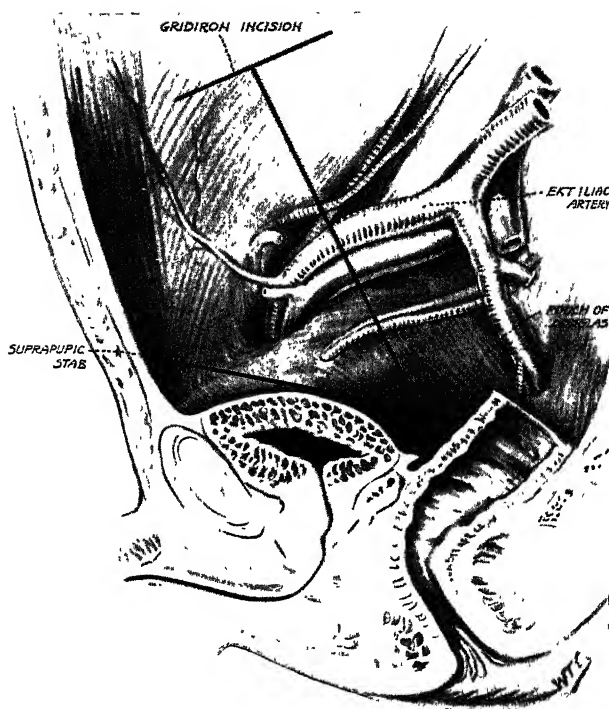
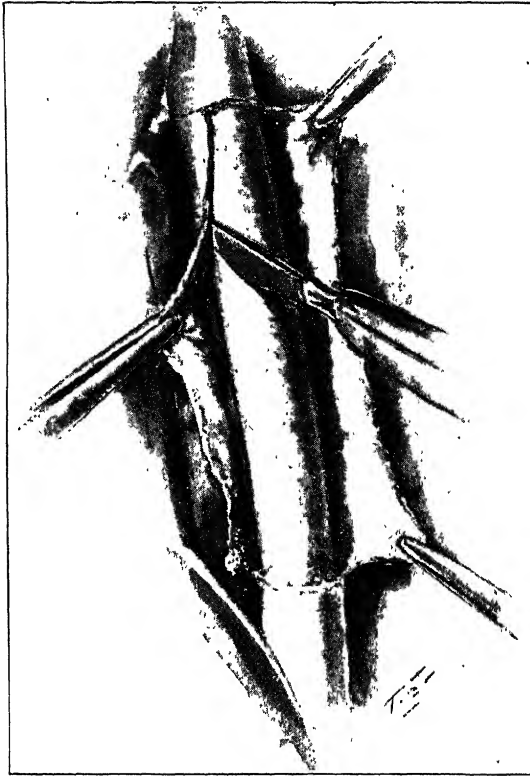


Diagram illustrating the shorter method of approach to the pouch of Douglas by the supra-pubic route, compared with drainage through a gridiron incision—also proximity of the tube through the latter incision to the external iliac vessels. As this is an antero-posterior view, the line indicating the gridiron route of drainage is foreshortened, and hence the actual distance is longer than that represented by the line.

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PLATE III.

PERI-ARTERIAL SYMPATHECTOMY



Method employed in removing the adventitia of the femoral artery.

*Kindly lent by the
'Journal of the American Medical Association'*

in 1105 cases operated upon at once was 6.5 per cent. These figures bear out very strikingly the remarks made in these pages in previous years by the reviewer.

Other rather surprising facts are noted. The complications and deaths were far lower in those cases in which the original wound was closed and a suprapubic drain inserted into the pouch of Douglas. (*Plate II*). A stab wound in the flank seems to occupy an intermediate position. It is shown that the infection spreads most rapidly into the pelvis, and indeed this should be encouraged, as it is well known that absorption is slower there. A suprapubic wound is closer to this region than the original incision.

Another point is that in 94.5 per cent of cases drainage was deemed necessary. In America it has become the routine to omit drainage in a far larger number of cases. In my own clinic I doubt if 50 per cent are drained, and I believe that this represents the custom of most surgeons on this side of the Atlantic. If drainage is left in, a walled-off suppuration in the peritoneum is almost certain to occur; whereas if the wound is closed the peritoneum is able to take care of a surprising amount of infection after the focus is removed. Of course, if frank pus is encountered, or granulation tissue, drainage is necessary. These remarks, however, do not apply to the abdominal wall. This possesses no immunity to such infection, and it is here the practice to drain it, especially the subcutaneous fat, in a very high percentage of cases. A small rubber tube or a few strands of braided silkworm-gut usually suffice.

Chronic Appendicitis.—The literature continues to reflect the growing doubt of the profession as to the condition of chronic appendicitis. Whiteford,⁴ Lichty,⁵ Doolin,⁶ and Rowan⁷ all look on this matter in the same way. They believe that in a very high percentage the removal of the so-called chronic appendix is a mistake, and leaves the patient worse off than he was before. Lichty observed 400, in which only 225 were cured. It is the opinion of many that no diagnosis of chronic appendicitis should be made without a history of previous acute attacks. Definite signs of sepsis must be found, as evidenced by increased white blood-count or fever. The simple complex of abdominal pain referred mostly to the right iliac region, together with local tenderness, is not sufficient to warrant appendectomy. Whiteford calls attention to bad features of these mistakes. First is the effect on the surgeon; he is inclined to lay the blame for all sorts of distant trouble on the appendix, and this tendency hinders the study of the true causes of abdominal pain. On the patient the effect is even worse; the life-saving operation of appendectomy is being brought into disrepute, and people are inclined to refuse to submit to a really necessary operation, because they know of so many cases in which it has been performed unnecessarily with bad results.

REFERENCES.—*Jour. R.A.M.C.* 1922, Dec.; ²*Minnesota Med.* 1923, Sept.; ³*Brit. Jour. Surg.* 1923, April; ⁴*Practitioner*, 1922, Aug.; ⁵*Jour. Amer. Med. Assoc.* 1922, Sept. 9; ⁶*Irish Jour. Med. Sci.* 1923, Jan.; ⁷*Minnesota Med.* 1922, June.

ARTERIAL DECORTICATION.

Sir W. I. de C. Wheeler, F.R.C.S.I.

Since the publication of Leriche's researches on the peri-arterial sympathetics, much interest has been aroused in this field of operative surgery. When the sheath of an artery is pinched, the vessel contracts and pulsation stops, but the circulation is not entirely interrupted. Conversely, there is vasomotor dilatation and hyperæmia after removal of the sympathetic nervous plexus included in the external layer of blood-vessels. Leriche proved experimentally on rabbits that ulcers healed more rapidly in an area supplied by an artery deprived of the sympathetic plexus. He recommends the operation of sympathetomy for the cure of trophic troubles leading to ulcers, and thinks it is

indicated in painful phenomena coming under the term 'causalgia'. Twice he obtained a good result in Raynaud's disease.

Callander¹ draws attention to a case from the surgical clinic of Dr. Halstead, in which excision of a left subclavian aneurysm was followed by a rise in surface temperature in the hand and forearm. This rise in surface temperature was attributed to the vasodilatation accompanying removal of the sympathetic nerve plexuses with the segment of artery bearing the aneurysm. Callander describes the operation of arterio-sympathectomy. The main artery is exposed by the classic route at a considerable distance proximate to the part affected. The external fibrous sheath covering the artery is incised for a distance of 8 to 10 cm. The inner more intimate sheath and the adventitia are now exposed; this inner sheath, which is fused with the adventitia of the artery, is grasped with tissue forceps, and is incised directly on the vessel wall. The grasp is maintained on one of the lips of the sheath of filmy tissue thus isolated, and this structure is completely freed from the artery over the length of the incision with a knife or fine scissors. The artery is in this manner stripped of its external coat, together with the fibrous tissue which is adherent to it. Occasionally one is able to remove only small cellular fragments of this external layer. Leriche lays much stress on complete removal of thin meshes of loose tissue which adhere to the body of the artery. The thoroughness of the removal is seen when the artery is gently swabbed with moist gauze. The arterial decortication is continued until the main body of the artery appears as a smooth homogeneous surface. Collateral branches require exposure and preservation. Callander verifies Leriche's observation that a marked diminution in calibre takes place during the denudation. The reduction in size is far more marked in the case of small arteries than in large arteries like the femoral. Leriche noticed an increase in temperature in the parts distal to the decortication, often on the evening of operation or the following morning, but more usually after thirty-six hours.

Halstead and Christopher² discuss the same subject. The paper opens with a reminder that in 1851 Claud Bernard discovered that when the sympathetic nerve is cut in the neck of a rabbit, blood-vessels in the ear at the same time become very much dilated; and that if the peripheral end of the severed nerve is stimulated electrically, the ear becomes blanched owing to a constriction of the blood-vessels.

An interesting case is recorded in this paper. The patient, age 55, apparently suffered from endarteritis obliterans. Six weeks previous to admission, his right foot began to be painful and felt numb, and these symptoms had grown progressively worse. After exhaustive medical treatment, without result, periarterial sympathectomy or amputation was recommended by Dr. Halstead. The femoral artery of the right leg was dissected out, so that the junction of the middle and lower thirds was visible. The adventitia was incised with great care, and stripped completely off for a distance of 5 cm (*Plate III*). Thirteen days after operation the patient was discharged. Ten months later he was readmitted suffering from carbuncle on the neck. The condition of the leg had completely recovered, and the patient was on his feet for the most part of twelve hours each day. Numbness present during the operation had disappeared; the severe pain present before the operation, which felt worse when lying in bed, had also disappeared.

Lehman³ comes to the following conclusions: (1) 'Perivascular sympathectomy' of Leriche does not result experimentally in the dog in the physiological changes in the extremity described by him in clinical cases. (2) Vasodilatation resulting from proved total sympathectomy does not affect wound healing.

Turbin⁴ discusses the utility of peripheral sympathectomy in severe cases

of causalgia. Technically, he says, the operation is very simple. He brings out certain points on which Leriche lays particular stress. The large arterial trunk is isolated for a distance of 8 to 10 cm., and the delicate connective tissue clinging to it then removed. The first step is the usual exposure of an artery in its course. In the author's cases it was always effected at a site higher than the injury. For the removal of the connective tissue from the arterial trunk, Turbin uses instruments of the type employed in operations on the eye (scalpel, pincettes, etc.). In order to determine whether all the connective tissue has been removed, he moistens the artery; if any connective tissue remains, the artery shows the colour of flesh; but if the artery is bare, it is light grey.

During the operation a contraction of the arterial wall usually takes place; the calibre of the vessel becomes smaller, the pulse at the distal end becomes weaker, and the parenchymatous hæmorrhage from the tissues is increased. These phenomena may be attributed to a spasm of the vessel wall and compensatory expansion of the capillaries. The sphygmogram made on the operating table shows a considerable decrease in the size of the pulse wave of the diseased extremity. The ascending limb is less steep, the apex rather flat, the elevation of the descending limb becomes indistinct, the angle formed by the two limbs approaches a right angle, and the variations in elasticity are slight. The entire picture suggests the sphygmogram of advanced arteriosclerosis.

Before the patients were subjected to operation they were examined in the neurological department, kept under observation for a considerable length of time, and given physiotherapeutic treatment. In every case the operation of neurolysis was tried first, and sympathectomy was done only when this had failed. Hysteria was excluded in every instance.

In all, eight peripheral sympathectomies were performed during the war: five on the brachial artery, one on the femoral and sciatic arteries, one on the femoral artery, and one on the popliteal. The results in these eight cases are summarized as follows: Long-continued conservative treatment caused no improvement. Neurolysis was a failure. Following Leriche's sympathectomy there was rapid improvement, pain and contractions disappeared, the trophic, vasomotor, and secretory disturbances decreased, and the ability to move the extremity returned.

Peri-arterial Injection of Alcohol in the Treatment of Senile Gangrene.—Sampson Handley⁵ records two cases illustrating a method of producing vasoconstrictor paralysis. The method is an alternative to the operation of sympathectomy.

In the first case, age 69, all the toes of the right foot were blackish, cold, wrinkled, and almost immobile. The gangrene appeared to extend some distance along the metatarsals, both on the dorsal and plantar aspect. No pulse could be felt in any of the arteries of the right lower limb, even of the femoral. The arteries were hard and cordlike, and the left foot was also blue and cold. The femoral artery was exposed in Hunter's canal under light ether anaesthesia. The sheath was divided, and a very fine hypodermic needle was introduced obliquely into the tunica adventitia; 4 min. of rectified spirit were injected at each of four equidistant points around the circumference of the artery. There was a remarkable return of warmth after the alcohol injections, and an area the size of a penny on the dorsum of the foot which had been black, returned to normal colour.

The revitalization of a portion of the foot which had shown all the early signs of mortification and had been provisionally marked off for separation by a slight but definite line of demarcation, is, says Handley, a phenomenon unique in his experience. Was this tissue dead, and did it undergo a local resurrection? It seems more likely that, though it showed the signs of death, it was in a

moribund but still recoverable condition when the reviving tide of blood reached it.

In the second case the left foot showed a dry type of gangrene, of an embolic nature. Immediately after the operation of injection, the temperature on the affected side rose 1.75° , and remained for some days more than a degree higher than on the sound side. Twelve days after operation the temperature of the sound leg was 30° , and of the affected leg 32.5° . The gangrene remained dry and stationary; no recession of the line of demarcation was noted.

Differences between the Results of Sympathectomy and of Peri-arterial Alcohol Injection.—Handley discusses the work of Leriche, and draws attention to the fact that after peri-arterial sympathectomy the vasodilator reaction is transitory. It diminishes about the fifth or sixth day, and disappears in from three to four weeks. In sympathectomy local contraction of the artery occurs, and a period of very low circulation, lasting up to fifteen hours, precedes the onset of vasodilator symptoms. The vasodilator symptoms, when they supervene, last only for three or four weeks. It is obvious that an initial extreme vasoconstriction lasting possibly as long as fifteen hours may be very dangerous in gangrene or threatened gangrene, and that the period of vasodilatation secured—three or four weeks only—is all too short for the accomplishment of such a great work, as the separation of the toes, or of a portion of the foot. It is noteworthy that Leriche does not record success in the treatment of actual, but only of threatened, gangrene, so that the method here described appears to succeed in cases not amenable to arterial sympathectomy.

In peri-arterial alcohol injection, judging provisionally from the two cases in which the author has used it, *there is no initial period of diminished circulation*; the vasodilator results aimed at by the operation are produced at once, without any temporary aggravation of the condition which the operation is intended to cure. No local contraction of the artery occurs at the site of the injection. In the second case, the rise in temperature in the affected limb immediately after operation shows that the vasodilator action is immediate.

[Three cases treated recently by the reviewer, two by Handley's method and one by arterial decortication, appeared to benefit considerably by the operation. One case—a typical causalgia following injury to the ulnar nerve in the forearm—got almost well in dramatic fashion; a case of senile gangrene appeared to become localized as the result of operation; and a very intractable ulcer of the leg healed after femoral sympathectomy when all other forms of treatment had failed.—W. I. de C. W.]

Handley suggests that in sympathectomy there are two factors at work, namely: (1) The interruption of the vasoconstrictor fibres; (2) A local injury of the muscular coat of the artery causing a local muscular spasm which produces the initial constrictor symptoms. The latter factor is very undesirable, and easily avoidable by substituting for sympathectomy the method of alcohol injection. The evil results of local injury of the muscular coat of the artery would appear to be remote as well as immediate. It is difficult to understand why the effects of sympathectomy should pass off within three or four weeks, while the effect of alcohol injection remains unimpaired at the end of nine weeks, except by assuming that the injury to the muscle coat done in sympathectomy is followed by a ring-constriction of the artery due to local fibrosis of the injured muscle.

Finally, the author claims that peri-arterial alcohol injection is a much simpler method than excision of a lamina of the arterial coats. To Leriche belongs the entire credit of showing the therapeutic possibilities of artificially produced vasoconstrictor paralysis, but his method of arterial sympathectomy has serious disadvantages, and the author thinks that the method described

in his paper is destined to replace it. Peri-arterial alcohol injection has no initial constrictor effect, and the resulting vasodilatation is more lasting than that produced by Leriche's operation. The procedure should possess even greater value in the prevention of senile gangrene than in the treatment of gangrene which has already taken place. It may prove to be applicable to other ischæmic conditions of vasomotor origin.

REFERENCES.—¹*Ann. of Surg.* 1923, Jan., 15; ²*Jour. Amer. Med. Assoc.* 1923, Jan. 20, 173; ³*Ann. of Surg.* 1923, Jan., 30; ⁴*Surg. Gynecol. and Obst.* 1922, Nov., 371 (abstr.); ⁵*Lancet*, 1922, ii, 173.

ARTERIAL PRESSURE IN OLD AGE.

Drs. C. Lian and L. Pollet.

(Translated by Carey F. Coombs, M.D., F.R.C.P.)

Too often it is thought that the arterial tension rises *pari passu* with advance of age; if it were so, the pressure would always be very high in old men, and it would be in such persons that the highest pressures would be found; but it is not so. All recent work goes to show that gross hypertension is particularly seen about the age of fifty, and terminates life before old age is reached. That this is so is clearly shown by statistics recently published by Thomson and Todd,¹ drawn from observations of 102 men ranging from seventy-five to ninety years, of age; 49 of them had a normal systolic pressure, i.e., below 150 mm. Hg, while in only 10 it had exceeded 190 mm. Hg, the highest being 250 mm. Hg. The diastolic pressure was normal, that is to say, below 90 mm. Hg, in 79 cases. There is therefore an increase in the pulse-pressure due to loss of arterial elasticity from atheroma. (Fig. 9.) Very similar are the results published by Dumas, Chevassue and Labry,² drawn from 50 normal subjects aged over seventy, 20 of them being over eighty. Among these latter there are 8 with a systolic pressure below 150 mm. Hg, 4 only being above 190 mm. Hg. The diastolic pressure exceeded 90 mm. Hg in 5 persons only. The pressures in men between seventy and eighty years of age were closely similar, except that they tended to be slightly higher. In old hemiplegics who have become permanent invalids, the arterial tension is about normal as a rule; but the measure of the pressure is of great value in prognosis if it is made when the hemiplegia first appears. If at this moment a very high tension is found, exceeding 200 mm. Hg, there is reason to fear that the cerebral hæmorrhage will not remain limited, but that it will spread to the ventricles or meninges and be rapidly fatal.

REFERENCES.—¹*Lancet*, 1922, Sept. 2; ²*Bull. Soc. Méd. Hôp. de Lyon*, 1923, April 17.

ARTERIOSCLEROSIS. (See RETINA, DISEASES OF.)

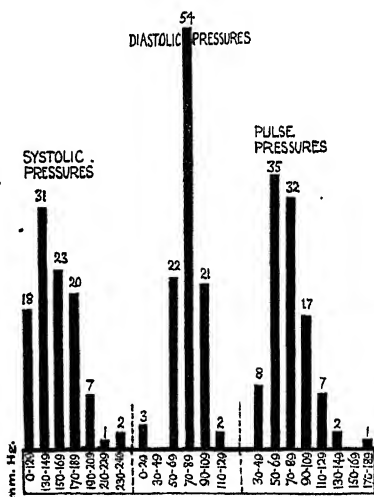


Fig. 9.—Graph showing blood-pressures taken from 102 men, from 75 to over 90 years of age, at the Royal Hospital, Chelsea.

(Kindly lent by 'The Lancet'.)

ARTERIOSCLEROSIS, INFANTILE.*Drs. C. Lian and L. Pollet.**(Translated by Carey F. Coombs, M.D., F.R.C.P.)*

Diffuse hyperplastic sclerosis of arteries is not as rare in children as is generally thought. It is interesting, therefore, to note the principal points of Evans¹ recent review of the subject.

ETIOLOGY.—The absence of a majority of the factors responsible for senile arteriosclerosis brings out the more clearly in the child the relation that exists between chronic nephritis and arteriosclerosis. This nephritis itself is dependent on a number of causes. It may be related to congenital malformation of the kidneys, such as polycystic disease, or it may be a sequela of an acute infective lesion of the kidneys, particularly after scarlet fever. Finally, but less often than one might think, it is a result of congenital syphilis, with or without renal disease.

SYMPTOMS.—The disease has a very insidious onset, and appears at various ages, sometimes so early that it may be regarded as congenital. Usually attention is attracted to it by headache, nocturnal pollakuria, pains in the limbs, or occasionally an epileptiform attack. Usually there are neither dyspnoea, nor gastro-intestinal symptoms, nor oedema, but almost always the arterial pressure is high (160, 190, 190, 250 mm. Hg systolic in Evans' four cases), with hypertrophy of the left ventricle. But there are cases in which the sclerosis is as yet limited, attacking the kidneys more especially, where the pressure and the heart appear normal.

PROGNOSIS.—These patients rarely reach adult life, succumbing, as a rule, to cerebral hæmorrhage or uræmia, less often to cardiac failure.

REFERENCE.—¹*Quart. Jour. Med.* 1922, Oct.

ARTHRITIS, ACUTE. (*See BONE AND JOINT SURGERY.*)**ARTIFICIAL RESPIRATION.** (*See RESPIRATION, ARTIFICIAL.*)**ASTHMA.***W. H. Wynn, M.D., F.R.C.P.*

The recognition that certain cases of asthma are manifestations of anaphylaxis has introduced a new era in the study of this disease. The association of hay fever and asthma with specific substances was well known to the physicians of a former generation, and Hyde Salter's classical description of cat asthma shows how closely he approached modern conceptions. But his work did not receive the attention it deserved, and the connection of asthma with animals was regarded as fanciful or neurotic.

With Richet's experimental work on anaphylaxis in 1902, followed by that of Arthus and Theobald Smith, a new phase began. The clinical applications of this work were soon recognized, and in 1906 Langlois and Wolff-Eisner independently pointed out the anaphylactic nature of hay fever. Billard and Maltet a year later showed the connection of hay fever, urticaria, and asthma with anaphylaxis. Meltzer's paper in 1910 on "Bronchial Asthma as a Phenomenon of Anaphylaxis" attracted more attention and initiated the change of opinion in regard to the etiology of asthma. Gradually there has emerged from the work of many authorities, prominent among whom are Noon, Freeman, Schloss, Chandler Walker, Cooke, Vander Veer, Rackemann, Longcope, and others, the conception of a group of diseases which Freeman has termed the toxic idiopathies, due to a sensitization to particular proteins. This group includes asthma, hay fever, urticaria, angioneurotic oedema, intermittent hydrarthrosis, and some forms of eczema and gastro-intestinal disturbance. Some authorities would include prurigo, dermatitis herpetiformis, migraine, cyclical vomiting, and some forms of epilepsy.

ANAPHYLAXIS.—Anaphylaxis consists in the development under certain circumstances of a hypersensitiveness to foreign proteins which are not in themselves toxic. If an animal is injected with some foreign protein, i.e., a protein not normally present in the animal's tissues, and then a sufficient incubation period of ten days or more is allowed to pass, a second injection of the same protein will cause serious symptoms or even death. The reaction is specific, and the protein used for the exciting dose must be the same as that for the sensitizing dose. The protein may in itself be non-toxic and as harmless as white of egg or the protein of milk or wheat. Whatever the protein, the symptoms are the same in the same species of animal, but vary in different species. The symptoms found are restlessness, itching of the skin, a fall of temperature, gastro-intestinal irritation, quickened and then difficult breathing, weakened heart action, and finally collapse. In the guinea-pig, spasm of bronchial muscle is a characteristic feature. We are far from a complete understanding of the mechanism of the condition, but it is certain that it is due to the formation of an antibody. Friedberger holds that the entrance of protein causes the formation of precipitin, and that complement acting on the serum precipitate (antigen plus precipitin) produces a toxic body, anaphylotoxin. More recently a cellular explanation has been given, and Dale believes that the antibody must get out of the blood into the living tissue-cells before the animal is made sensitive. The contact of the foreign protein with the antibody in the cell protoplasm we may suppose produces a colloidal disturbance, a reaction analogous to the precipitin reaction in serum. Although the symptoms in different animals vary, yet on analysis they can, as Dale has pointed out, be resolved into a complex of which the essential features are an intense stimulation of plain muscle and a poisoning of the endothelial wall of blood-capillaries. A strip of plain muscle taken from a sensitized guinea-pig and washed free from blood will respond by contraction to an application of the sensitizing protein. Similarly, if the lungs of a sensitized guinea-pig are removed from the body, washed free from blood, and then perfused with a solution of the protein, a spasm is set up so tight that air can neither be forced in nor out of the lungs.

HÆMOCLASIC CRISIS.—This is the inappropriate name given to certain changes in the blood occurring in the interval between the protein injection and the appearance of symptoms. They have been studied especially by French authors such as Abrami, Widal, Brissaud, Vallery-Radot, and others. The crisis consists of a leucopenia with a reduction of the polymorphonuclear cells until they become equal to or even fewer than the mononuclears, shortened coagulation time, changes in viscosity and the refractive index, a fall of blood-pressure, and increased permeability of capillary endothelium with increased lymph flow. Recovery from the attack is followed by an eosinophilia. The hæmoclasic crisis has been found in anaphylactic shock, asthma, urticaria, migraine, paroxysmal hæmoglobinuria, epilepsy, malaria, and with intravenous protein injections.

PATHOLOGY.—It is generally agreed that the attacks of paroxysmal dyspnoea are due to an obstruction of the bronchi; but whether this is due exclusively or chiefly to a spasm of the bronchial muscle, to swelling of the mucosa, or to a secretion from the bronchial glands, or to a combination of these, is undecided. Under the nervous theory of asthma, spasm of bronchial muscle has been assumed, and the anaphylactic theory has given support to this contention that muscular spasm is the important factor. This view has mainly been deduced from the analogy with the lungs of the anaphylactic guinea-pig, and has received support from the relief obtained from the use of atropine and adrenalin. Sir Andrew Clark likened asthma to an urticaria of the bronchi.

and the peculiar sputum suggested that obstruction was caused by an acute catarrhal exudate. Hitherto post-mortem evidence derived from a detailed study of the lung structures of human asthmatics has been lacking; but Huber and Koessler, in a valuable paper, have recently given the results of a very careful and minute examination of the lungs of six cases. (*Plate IV.*) Two were clinically bacterial, and one of these died in an attack and the other from drowning; one was sensitive to horses and died from acute anaphylaxis after an injection of horse serum, one sensitive to wheat died in an attack, and two sensitive to unidentified proteins died from infection. In all the cases there was increased thickness of the wall of the bronchi and bronchioles as compared with that of other persons of the same ages. The increase was partly due to increase of muscle such as would be brought about by hypertonus, repeated contraction, and hypertrophy, but also to the increase in the subepithelial layer and enlargement of the mucous glands. The cross-sections of bronchi of three of the cases showed much contraction, with epithelial folding almost entirely occluding the lumen, the picture resembling that of the bronchi in an anaphylactic guinea-pig. In two of the cases, one dying in an attack and the other from anaphylactic shock, there were definite areas of atelectasis; some were evidently old and had undergone fibrosis, and some were of recent origin. They represent the ultimate stage of the acute emphysema in an area of lung in which the normal gaseous exchange had become completely interrupted.

DESCRIPTION OF PLATE IV.

Fig. A.—Bacterial type of asthma. Bronchiole almost occluded by a folding of the epithelium.

Fig. B.—Another case, showing bronchiole occluded by folds of epithelium.

Fig. C.—Bronchiole of a guinea-pig: fatal horse-serum anaphylaxis.

Fig. D.—Food asthma. Area of absorption atelectasis with an adjoining area of normal lung tissue.

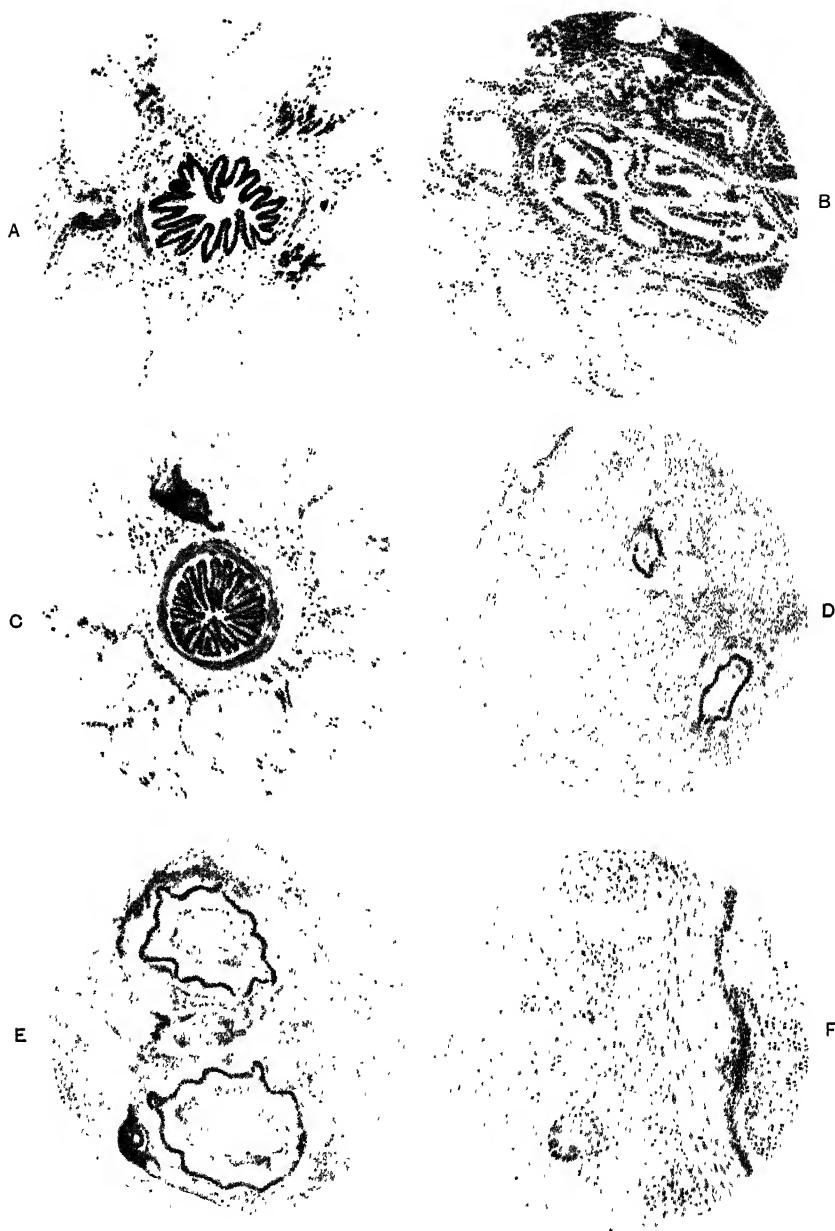
Fig. E.—Same case as *Fig. D.* Occlusion of bronchi by mucous exudate.

Fig. F.—Cross-section of a large bronchus. Note the muscle bundles, distended capillaries, and extensive infiltration by eosinophil cells.

The pathological changes showed a parallelism between the clinical features and the structural changes. In one bacterial case, with much bronchorrhœa associated with the paroxysms, there was a striking hypertrophy of the mucous glands; in the other bacterial case, which during life had much unproductive cough leading to bronchial spasm, there were hypertrophy of smooth muscle and atrophy of glands. In the food-asthma cases there was hypertrophy of muscular and glandular systems, both of which played a part in the stenosis. In the case dying of anaphylactic shock there was acute emphysema and marked contraction of bronchi and bronchioles by a well-developed muscle layer. Hyperæmia and cellular infiltration of the bronchial wall and increased activity of the glands lead to swelling and thickening, and can produce mechanically as well as chemically irritation of nerve-endings and, indirectly, bronchospasm. The abundant secretion of the epithelium and hyperactive glands obstruct, in some cases completely, the already narrow lumen. In this way both systems, exudative and bronchomuscular, act simultaneously in the production of the stenosis: in some cases one more than the other, but always to some extent both. These observations make it plain that the allergic reaction of the tissues is not confined to the smooth muscle fibre system, but involves also the whole organ system which serves exudative processes, endothelium, epithelium, capillaries, and glands. The changes were not equally

PLATE IV.

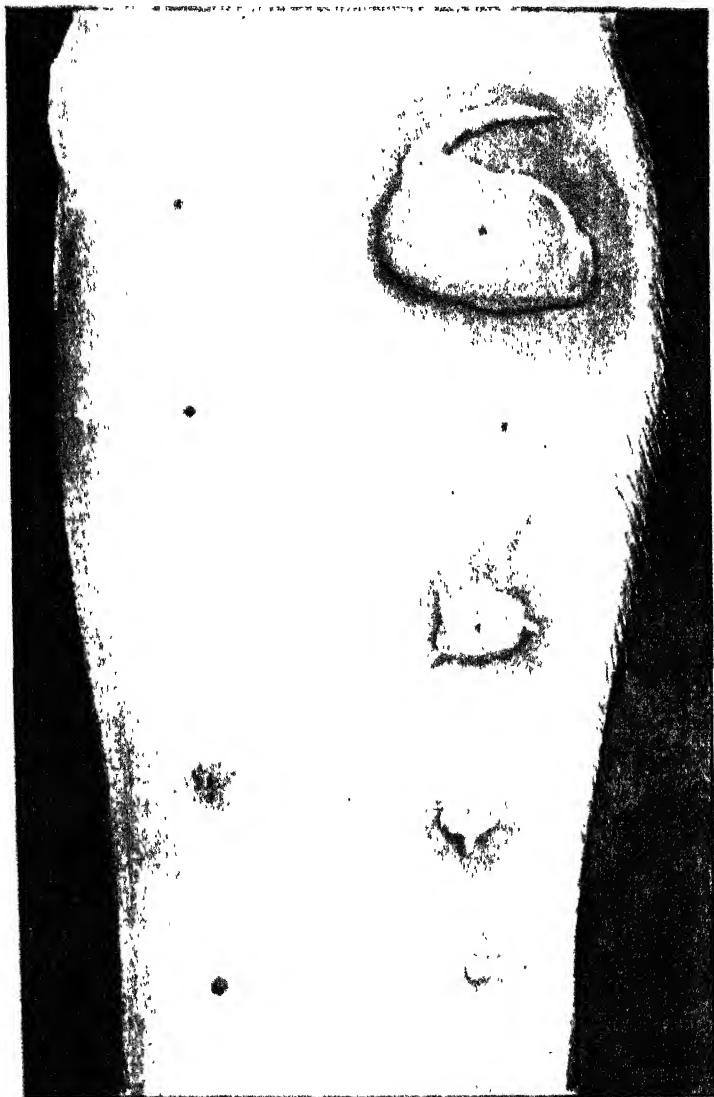
ASTHMA: VARIOUS TYPES



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PLATE V.

ASTHMA TYPES OF DERMAL REACTIONS



1, 3, 4, 5, and 9 are negative reactions; 2 + + + + reaction to Timothy grass pollen; 6, + + + reaction to horse dandruff; 8, + + reaction to oats; 10, + reaction to wheat; 7, An unusual type of reaction without the wheal appearing.

From 'Asthma' (Frank Coke, by kind permission

present all over the lungs, but often involved one lobe or part of a lobe to a greater degree than others.

Eosinophilia.—The chief cellular reaction was eosinophilia. Local accumulations of eosinophils were found in the bronchial wall as well as in the sputum. On the basis of several hundred examinations in asthma and other respiratory disease, the authors confidently state that the coincidence of sputum and blood eosinophilia is pathognomonic of asthma, the only exceptions being pulmonary distomatosis and hydatid disease. They believe that the tissue eosinophilia is due to emigration from the blood, and that there is an increased formation of eosinophils in the marrow stimulated by a chemotactic toxin. Eosinophilia appears to be a response to a stimulus produced by certain substances derived from the breakdown of proteins. As we have already pointed out, eosinophilia follows the hæmoclastic crisis, and it is constant during an attack of hay fever. In bacterial asthma the eosinophilia is less marked and may be absent. This may mean that there are types of asthma not of anaphylactic origin, but due to intoxication with peptones or amines, bronchospastic poisons formed by the action of bacteria on tissue proteins. The term anaphylaxis should not be applied loosely to every form of asthma. Huber and Koeller lay down the following conditions, some of which should be fulfilled in cases to which the term is restricted: (1) Positive skin sensitization tests for one or more specific proteins. It is possible, however, to be sensitized in the allergic sense and to show no skin reactions. (2) Blood, sputum, and tissue eosinophilia, showing an altered reaction of the human organism to a foreign protein. (3) Relief from spasm by the use of adrenalin or atropine. (4) Desensitization by repeated injections of the exciting protein. (5) Freedom from symptoms on removal of the exciting protein. (6) Passive sensitization of a laboratory animal with the blood of the asthmatic. (7) Post-mortem examination in fatal cases to determine if there are any changes which account for the sudden death and which simulate the changes found in an anaphylactic guinea-pig.

SPECIFIC SENSITIVENESS.—There are three methods by which sensitiveness to a protein can be tested clinically: (1) The ophthalmo-reaction. This resembles the Calmette reaction with tuberculin. Noon applied it in hay fever for testing sensitiveness to pollen. It is inconvenient and not free from risk, and could not be used for the testing of many substances. (2) The intradermal method. A minute quantity of a protein extract is injected into the layers of the skin by means of a fine hypodermic needle. It is very delicate, but is apt to cause a marked traumatic reaction, and may give rise to a constitutional disturbance. (3) The dermal or scratch method. This is commonly used, but is less delicate than the intradermal method, and reactions may be missed which are plain and decisive with the latter. Two rows of small abrasions are made on the flexor surface of the forearm with a blunt scalpel, care being taken not to draw blood. Proteins are applied to these scratches in order. They may be applied in a solid form, a drop of decinormal sodium hydrate being added as a solvent, or in prepared solutions. Reactions are also given by the raw material, dried foods, hairs, or feathers, in a finely powdered state, but this is inconvenient in practice. Fifteen or twenty proteins can be tested at a sitting. With a positive reaction signs appear in a few minutes, and usually reach a maximum in twenty to thirty minutes and then slowly fade. The erythema produced by the scratch does not fade, but spreads, and a wheal appears at the site and increases, sending out pseudopodia-like processes until it is as big as a farthing or more. (*See Plate V.*)

Obviously the number of proteins used for the tests may be very great. At the New York Hospital 130 test substances are used. In some cases an unusual protein easily overlooked may be the cause of sensitiveness. The patient's

history may sometimes give a clue. An asthma occurring at all times of the year cannot be due to some seasonal food such as strawberries or asparagus, and a seasonal asthma will not be caused by an every-day food such as wheat or potatoes. Asthma occurring in winter will not be due to hay pollen. In most cases the history will give no definite clue, and the proteins chosen must be those which experience has shown to be the most likely considering the patient's habits and environment. Animal hairs and feathers should never be omitted, as they give rise to more cases of sensitiveness than the foods. Of the foods, the commonest to give reactions are oats, wheat, egg-albumen, milk, beans, peas, cabbage, almonds, cheese, chicken, rice, and tomatoes. Orris root, from its use in perfumery, is by no means an uncommon cause. Among animal proteins, horse dander and cat hairs appear to be the commonest to give reactions. Rabbit hair is also a common cause owing to its widespread use for furs, felt hats, mattresses, etc., and the use of the animals as pets. Goose and chicken feathers used for pillows and beds may cause sensitiveness. Dogs give rise to fewer cases than cats. Several cases have been recorded of sensitiveness to mice. Cattle hair has been found as a cause in a few, and sensitiveness to human hair has also been recorded.

Considerable reliance can be placed on positive reactions to epidermal proteins, pollen, and orris root. The reactions are constant, and will occur at each trial. The skin test corresponds with the history, and can be taken as indicating the cause of the trouble. With food proteins we are on less sure ground. In some cases the patients will give a history of being upset by some particular food, such as eggs, oatmeal, almonds, and the skin tests will confirm this. One of my patients only had asthma after eating Brazil nuts. Another gave a history of asthma since her marriage five years before; as a girl she had had occasional attacks. She gave a positive dermal reaction to oatmeal, and then said that her husband was fond of porridge and insisted upon her taking it, although she disliked it and rarely had it as a girl. The asthma ceased when the oatmeal was no longer taken. We often find instances of positive reactions which do not agree with the history (there is a case of an asthmatic Jew who reacted to pork). They may give different reactions at different times. Foods which give positive reactions may be eaten without harm, whilst symptoms follow foods which give negative reactions. As foods must run the gauntlet of the digestive ferments in the alimentary canal, whereas pollen and animal epithelium are inhaled and come into direct contact with the respiratory mucous membrane, the difference between the two classes is readily understood. Food proteins when inhaled may, however, give rise to a very definite sensitization. A boy, age 3½, had asthma since he was seven months old. He gave marked reactions to oats and pea flour. His father kept a hay and corn shop in which the boy played. Once after climbing into a bin and stirring up the flour he had a very acute attack of asthma from which he nearly died. On the whole it may be said that the rôle of foods in causing asthma has been much exaggerated, and that the majority of cases are due to some inhaled protein.

Skin tests should not be omitted in cases clinically bacterial in origin unless the asthma is recent and has definitely followed an acute infection which persists. The infection may be of secondary origin. A case in point is that of a man, age 44, whose asthma began in Colorado fourteen years ago. He had been free from asthma for a year six years ago. He had much bronchitis and emphysema, abundant cough and sputum, and a nasopharyngeal catarrh. His case seemed typically one of bacterial asthma, but he gave a positive reaction to cat hairs. When the cat was removed and the house cleaned out thoroughly, he lost his asthma, except on a few occasions when

in houses where cats were kept or when people who kept cats entered his house.

Roughly, between 40 and 50 per cent of asthmatics give positive skin reactions. Out of Chandler Walker's 400 cases, 48 per cent reacted. Cooke obtained 73 per cent of 327 cases; Rackemann, in one series of 150 cases 49 per cent, and in a second series of 301 cases 64.1 per cent. Coke, in England, obtained 52 per cent of positives in 350 cases. In 150 consecutive cases of my own, 47 per cent gave positive reactions, and roughly two-thirds of these were caused by animal hairs and feathers; amongst the foods, by far the commonest was oats.

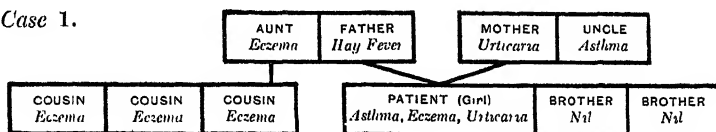
There is no doubt that skin tests are of considerable value. In many cases they show the cause of the asthma when this otherwise would not have been discovered. Their value is further shown by the success of treatment based on the information provided by the tests. As already stated, they are of most service in cases caused by sensitiveness to inhaled proteins. Reactions to several proteins are common; when these are caused by animal epithelium each reaction is of value; but when there is multiple sensitization to food proteins the indications are less clear, unless the clinical history shows a definite association. Occasionally a small wheal is seen around each scratch, none reaching the limits of a positive reaction. Positive reactions may be given by non-protein substances such as peptones and histamine. Then also a patient may have his bronchial tissues in an allergic state although his skin may not be so, and conversely we may have sensitization of the skin without asthma. Some other factor besides sensitization is required to produce the bronchial response, and the patient may react in other ways such as urticaria, eczema, or gastro-intestinal irritation. These phenomena vary according to the predisposition of the tissues, just as with a streptococcal infection one patient may have an arthritis, another a fibrositis, and a third an iritis or other symptom.

CAUSES OF SENSITIZATION.

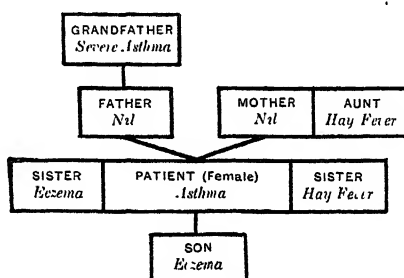
Heredity.—The importance of heredity is generally acknowledged. It is more marked in the sensitive than in the non-sensitive cases. Coke found 56 per cent of his 182 sensitive cases gave a positive family history, and 35 per cent of 168 non-sensitive cases. Cooke and Vander Veer found a history of some idiosyncrasy in 48 per cent of 504 cases of sensitization, and Schloss 59 per cent of 80 cases. The hereditary influence is shown by a tendency to become sensitive to some protein rather than to one particular protein. The inherited sensitiveness may not show itself as asthma, but may take the form of hay fever, urticaria, or eczema; that is to say, the toxic idiopathies have a common inheritance. Barber gives one family in which the father was an asthmatic, the daughter had hay fever, and a boy had eczema due to oats and suffered from urticaria whenever he ate strawberries. It is probable that the hereditary factor is underestimated, for a parent who is free from symptoms might transmit a tendency derived from his ascendants, and a positive history might not be obtained. There is some evidence that inheritance follows the Mendelian law, sensitization being transmitted as a dominant factor. The earlier the age that symptoms begin, the more likely is a positive history to be obtained; and the more marked the hereditary influence, the earlier symptoms appear. Thus Cooke and Vander Veer, in 44 cases with both paternal and maternal inheritance, found that the highest percentage of cases occurred within the first five years of life, in cases with inheritance from one parent only between the ages of 10 and 15 years, and in cases without a family history between the ages of 20 and 25 years. When appearing early there is a tendency for the sensitiveness to proteins to become multiple, or for one manifestation

such as eczema to be succeeded by or to alternate with another, such as asthma. (See also Fig. 10, from F. Coke's *Asthma*.)

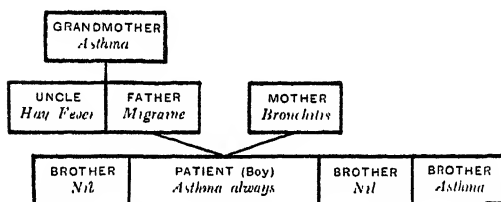
Case 1.



Case 2.



Case 3.



Case 4.

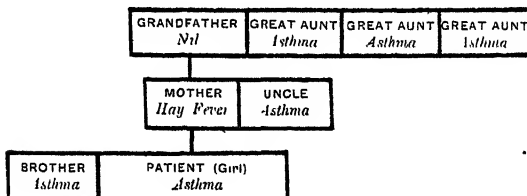


Fig. 10.—Cases showing family influence in the etiology of asthma, and the relationship of allied complaints.

Innate sensitiveness may take a long time to manifest itself, and it is probable that in man sensitization is always transmitted and never acquired. Thus, as Auld points out, one groom in a thousand may ultimately become horse-sensitive, or one baker in a thousand wheat-sensitive, because an inherent

dormant disposition has been activated. He considers that it is incorrect to say that a patient has become sensitized by a foreign protein, as the sensitization is already present naturally and has become activated by the protein. When a cell is naturally sensitized it may be activated by many different substances, both antigenic and non-antigenic.

The argument is further sustained by the difficulty in producing anaphylaxis in man. Tens of thousands of men received injections of horse serum during the war, but sensitiveness to horse serum is very rare. Horse serum has been given by mouth for gastric ulcer, but, as Rolleston points out, there is no record of hypersensitiveness being produced in this way. Everyone during the summer inhales pollen in large quantities, but few suffer from hay fever. There are innumerable opportunities for the entrance of foreign protein into the system, and yet asthma is an uncommon disease. An innate defect or predisposition seems to be necessary.

We must remember, however, that only half the cases of asthma are associated with sensitiveness to proteins, and it is possible that asthma may be directly produced by other means which do not require the same innate predisposition for their action.

Acquired Sensitiveness.—We have seen that for anaphylaxis an incubation period of ten days or more is necessary after the entrance of the protein. Similarly, for sensitization to occur in man, there must be contact with the protein intermittently, so that an incubation period of at least ten days has passed during which the protein was absent. Such a condition is fulfilled in the case of pollen. A considerable contact during certain months is followed by a long period without contact. Schloss's case illustrates another method. A child a few days old suffered from diarrhoea and was given albumen-water. He had no more egg-albumen until fourteen months old, when on being given some he developed urticaria. Afterwards, on various occasions, on accidentally taking egg, he was at once sick and his nose and mouth became swollen. Even after playing with eggshells, urticaria developed on the hands. A child brought up on the breast may have cow's milk for a day or two owing to his mother's illness, and then have no more cow's milk until he is weaned months later. A patient may have a surfeit of one food and then no more for a long period, as in the case of a lady sensitive to Brazil nuts. She remembers as a child finding a store of these nuts, of which she had a big feed. Substances only taken at long intervals, such as honey, strawberries, crab, asparagus, almonds, salmon, are more likely to cause sensitiveness than ordinary foods such as wheat, potatoes, beef, and mutton. Occasionally a patient reacts to some protein with which there has been constant contact for a long period, as a baker to flour, or a farmer to sheep's wool or cattle hair. Possibly there has been an incubation period at some time, or continual contact and over-dosage has at last allowed some protein to enter the blood unchanged. Opportunities of sensitization to feathers, cat and dog hairs, and horse dander are common. One girl patient of my own, age 11, was sensitive to rabbit hair. As a baby she had fur trimmings on her clothes; then no apparent contact until three years ago, when she was given a fur coat. For the last three years she has had asthma, and has especially bad attacks after visiting a friend who keeps pet rabbits.

It must be remembered that it is not the mere entrance of protein into the alimentary or respiratory tract, but the passage into the blood of intact protein, which causes sensitization. We do not clearly understand how the protein gains entrance. Presumably, in the case of the respiratory mucous membrane, phagocytes may ingest solid particles and carry them into the circulation. In the alimentary canal the proteins are exposed to the digestive action of ferments

and normally enter the system as amino-acids, the mucous membrane being impermeable to undigested protein. But there is evidence that this protection is impaired in abnormal conditions in infants, so that protein may enter the blood and even be found unchanged in the urine. In adults there is no direct proof of the manner of entrance; but it is possible that, though the cells of the mucous membrane may not absorb proteins, yet in inflammatory conditions and ulceration entrance may be effected by the agency of phagocytes. It is very difficult to render animals anaphylactic by swallowed protein; but the degree of sensitiveness in man is very much greater than that produced in experimental animals, and only very minute traces of protein are required to produce symptoms.

NON-SENSITIVE CASES OF ASTHMA.

The large proportion of cases which give positive skin reactions has led to the idea that all asthma is anaphylactic, and Miller, for instance, boldly defines asthma as "an anaphylactic manifestation characterized by recurrent attacks of paroxysmal dyspnoea due to spasm of the bronchioles developing as a result of exposure to a foreign protein to which the individual is sensitized." In Osler's text-book the more cautious definition is given: "A reaction of an anaphylactic nature in sensitized persons, in others possibly a reflex neurosis." At least 50 to 60 per cent of cases are of the non-sensitive type. With experience this number may be reduced. By the use of more test substances, and by improved methods of preparing proteins for testing, there will be fewer errors of diagnosis. There may be temporary desensitization, and, as already pointed out, in some cases of bronchial sensitiveness the skin may escape. Still, after making due allowance, there remain many cases which give no evidence of specific sensitiveness, and we must consider whether there are possible causes of non-specific activation.

Histamine, Peptone, and other Protein Derivatives.—Dale has shown that there is a whole group of natural poisons, partial cleavage products of proteins formed by bacterial or other ferments, which produce on injection similar symptoms to those of anaphylaxis. The best known is the base histamine, derived from the amino-acid histidine, which is a constituent of most proteins. Dale has isolated it from ergot of rye. In the alimentary canal its production is mainly dependent on a particular type of micro-organism. Thus, of 29 strains of *B. coli* studied by Hanke and Koessler, 6 were able to form histamine on a synthetic medium, and no other reaction, such as fermentation of sugars, could separate this group from the others. Other amines of bronchospastic and hypotonic action are also known. When tested by the dermal method, histamine gives a positive reaction in normal persons. It has been found in the stools of asthmatics. Coke believes that histamine is a probable cause of asthma when associated with bad digestion or torpid liver, and that a purge or careful dieting may then give relief.

Vaughan was able to split off from all proteins a poison group which, when administered to animals, produces symptoms resembling those of anaphylaxis.

In some cases toxic albumoses or other cleavage products of proteins may be the exciting cause. Auld regards most cases of asthma as due to auto-sensitization resulting from defective metabolism of foreign proteins. When sensitization is present, activation may occur from many non-specific substances. It is possible that endocrine disturbances may produce activating substances, as benefit has been observed after treatment with thyroid, ovarian, and other extracts.

Bacterial Asthma.—Bacterial infection may lead in a variety of ways to obstruction of bronchi. It has been assumed that the absorption of bacterial

protein from mucous surfaces or focal infections leads to sensitization, as in the case of other foreign proteins, and so give rise to asthma. Evidence, however, of a true allergic asthma of bacterial origin is meagre. Walker in 400 cases found positive skin tests to bacteria in 10 per cent; but some of these were sensitive to other proteins, and only 7 per cent were positive to bacteria alone. Coke obtained 20 positive reactions in 350 patients. In several hundred cases Huber and Koessler obtained only three or four positive reactions. Sanford, Caulfeild, and Vander Veer also obtained unsatisfactory results with bacterial protein. The test, however, has not been performed with the same thoroughness as with animal proteins. Stock antigen has been used, and mainly of staphylococci and streptococci only. Pneumococci, *M. catarrhalis*, *B. Friedländer*, and other organisms which have been found associated with asthma have not been used systematically, and better results might be obtained if protein from autogenous bacteria were used. The chemical nature of the protein may undergo a change in the course of its preparation, so that it fails to bring out a reaction, and with improved methods more reactions may be obtained. Evidence for sensitization to bacterial protein is found in the presence of eosinophilia, but it is less constant than with proteins of other origin. It may be very marked, sometimes slight, or may be absent altogether. When present it may be caused by protein derivatives formed by the action of bacteria on tissue or food proteins, and not by bacterial protein.

Clinically there is a definite group of cases associated with infection, and Huber and Koessler consider that this comprises 25 to 30 per cent of all cases. Of this group, possibly not more than a sixth give rise to sensitization. Among the remainder, catarrhal infections of the respiratory passages play an important part. These may produce an abundant exudate which, together with hyperæmia and swelling of the mucosa and glands, causes partial or total obstruction. In other cases there may be injury and loss of substance of the protective mucosa assisting the absorption of toxins which directly stimulate muscular spasm. Then again, poisons of the albumose or amine type may be produced by the action of bacteria on tissue or food proteins, and be carried from distant mucous surfaces or infective foci to the nerve-endings in bronchial muscle.

Confusion may be caused by the presence of secondary infections. Frequent asthmatic attacks lead to an unhealthy condition of the bronchial mucous membrane which favour the growth of bacteria. Nasal infections may cause enlarged turbinal bones, polypi, and chronically œdematous and hypersensitive mucous membrane, with the possibility of reflex stimulation of bronchial muscle. It must be borne in mind that polypi may be due to protein sensitization causing a congested œdematous mucous membrane rather than to an infected sinus, the infection being caused secondarily.

Nervous Factors.—It was formerly held that all asthma was reflex in origin. Hurst defines asthma as the reaction of an over-excitabile bronchial centre to blood-borne irritants and to peripheral and psychological stimuli. Apparently he holds that foreign proteins act as irritants to the centre and cause contraction by stimulation of the bronchomotor fibres of the vagus. But, as already pointed out, a spasm of bronchial muscle takes place in lungs removed from the body and washed free from blood, though we cannot exclude the possibility of the poison acting on peripheral nerve-endings in the muscle. Brodie and Dixon have shown that stimulation of certain parts of the nasal septum will cause reflex contraction of bronchial muscle. Touching the septum opposite the lower turbinal in an asthmatic may cause him to wheeze, and the contact with the septum of enlarged turbinals and polypi may act similarly. Distention of the stomach, bronchial irritation, uterine disorders, and intestinal worms may be associated with asthma, but in each case sensitization to proteins or their

derivatives cannot be excluded. It is unlikely that reflex causes alone can be responsible for attacks of asthma; but when sensitization is present it is not improbable that reflex stimuli may finally determine the onset of an attack.

Similarly, psychical stimuli may precipitate attacks. The sight of an artificial rose in a patient sensitive to roses, a vivid description of a field of mustard to a man who believed this plant to be the cause of his trouble, are well-known instances. Excitement, worry, annoyance may cause attacks. There is no inconsistency between such instances and the anaphylactic theory of asthma. It is not difficult to understand that a man who had constantly associated his attacks with a certain substance might develop a new reflex connecting the sight of this substance with the nervous control of his bronchi, or that a sensitized bronchial muscle might contract from stimuli reaching it from the higher nervous centres. Suggestion or emotional disturbances will not produce bronchospasm in the absence of the other factors.

Vagotonia, Endocrine Glands.—Eppinger and Hess applied the term vagotonia to a condition of hyperexcitability of the vagus and parasympathetic as opposed to sympathetotonus. Normally the sympathetic and parasympathetic, though antagonistic in action, are balanced until a call is made on the services of either. The over-activity of the bronchoconstrictor fibres of the vagus is kept in check by the bronchodilator fibres of the sympathetic. Eppinger and Hess consider that in asthma there is a constant over-action of that part of the vagus supplying the respiratory tract. Anaphylaxis is said to be associated with vagotonia. The functional activity of the autonomic nervous system is closely associated with the endocrine glands. Stimulation of the sympathetic will cause increased secretion of the thyroid, pituitary, and suprarenals, and opposite results will be obtained by stimulation of the parasympathetic. The effect of fatigue in producing asthma may be attributed to exhaustion of the suprarenals, a diminution of its secretion, and relative over-activity of the vagus, with a consequent lack of check to the bronchoconstrictor action of the vagus. The effect of adrenalin or of fright, which stimulates the suprarenals, in checking an attack of asthma, is explained by increased activity of the bronchodilator sympathetic fibres. In sleep the parasympathetic gains control, and this may explain the frequency of nocturnal attacks of asthma.

Some authors consider that a foreign protein depresses the activity of the suprarenals and therefore of the sympathetic. The resulting symptoms will show themselves in connection with the bronchi, the blood-vessels, or alimentary canal, according to the state of sensitiveness of these organs. An asthmatic will have bronchospasm, whereas a man with an irritable vasomotor system will develop urticaria or oedema.

It is doubtful how far vagotonia and sympathetotonia can exist as permanent physiological conditions, and the terms have been abused. Both with regard to the autonomic nervous system and the endocrine glands we know too little to speak with confidence on the part they play in asthma. As in the case of the alimentary canal, it would seem that both chemical and nervous stimuli play a part in the maintenance of tone of the bronchial muscles.

TREATMENT.

The removal of the innate predisposition to become sensitized is beyond our powers. In this sense a 'cure' is not possible. We may remove the cause of sensitiveness or overcome it by a process of desensitization. Some patients outgrow their hypersensitiveness. But removal of the cause will still leave the patient with his innate predisposition; no longer actively asthmatic, he remains a potential asthmatic. In practice we find that when a patient is

sensitive to one or more proteins,^f removal of these prevents the occurrence of symptoms, and sensitization to some other protein, though possible, does not often occur, and with passing years becomes less likely.

Avoidance of the Offending Protein.—When definite positive dermal reaction are obtained, avoidance of the proteins causing these reactions is obviously indicated. This is strikingly successful in cases sensitive to animal hairs and feathers. Removal of the cat or dog, followed by a thorough house cleaning, if possible with a vacuum cleaner, will be followed by immediate improvement. When sensitiveness to feathers is shown, feather beds, pillows, and cushions must be sacrificed. Mere removal from the bedroom is not sufficient: they must not be allowed in the house. Silk or kapok pillows must be substituted. The possibility of rabbit, horse, and cattle hair in furniture stuffing must not be overlooked. Fur garments may cause sensitization, and so may camel-hair dressing-gowns. It is more difficult to avoid horse epithelium, as there is sufficient floating in the air of towns to cause attacks in sensitized persons.

With food proteins, when the skin tests and the clinical history coincide, the particular food must be avoided. When the food is an uncommon one, such as asparagus, crab, or strawberries, or when it is unimportant, such as tomatoes, honey, custard powder, or mustard, there is no difficulty. With children hypersensitive to milk, eggs, or wheat, it is often difficult to decide what to do. If hypersensitive to only one of these, this should be omitted from the diet, and eventually the child will outgrow the hypersensitiveness. When two or three of these important foods are involved, it would be impossible to give a sufficient diet without them. Attempts at desensitization with peptone should then be made.

We can see that a change of environment, e.g., to the seaside, when successful in stopping attacks of asthma, does not act by virtue of a climatic condition, but because with the change the sensitizing protein is avoided; the cat or dog is left at home, or a flock mattress substituted for a feather bed. A boy sensitive to cats was free during a long holiday in Switzerland, but had an attack on board ship on his return. He was free from asthma in his own home, but it returned on visiting friends in another town. He stroked the ship's cat, and a cat was in his friend's home but not in Switzerland or his own home.

Desensitization.—Hay fever and hay asthma can as a rule be successfully treated by hypodermic injection of *pollen*. Injections should be commenced early in the year, so that the course is finished before the hay-fever season. The sensitiveness of the patient is first tested by the ophthalmic reaction, and treatment is begun with a small dose of the strength of extract which just gives a positive reaction. Injections are given every seven days until about 0.3 c.c. of a 1-100 strength is reached. About 15 to 20 per cent get complete relief, and 10 to 15 per cent find no improvement, the remainder having varying degrees of improvement. Treatment during an attack is much less successful. In this country only grass pollen is a common cause, and a vaccine of the pollen of Timothy grass apparently desensitizes against the effects of other grasses. In America there are four hay-fever seasons—February to April, due to the pollen of certain trees; April to July, due to grass pollen; June to September, due to the goosefoots and docks; and an autumnal type due to the pollen of ragweed; so that different vaccines must be chosen according to the type of sensitiveness.

With *animal hairs* that of the horse is practically the only one which cannot be avoided. The patient is first tested to find out the weakest dilution which will give a positive dermal reaction. A solution one-tenth weaker is chosen, and a few minims are injected hypodermically. Horse asthmatics may show extreme sensitiveness, and a solution of 1-1,000,000 may give a reaction. The

dose is then cautiously increased until the strongest dilution is reached. Horses should be avoided as much as possible during the treatment, and if necessary the patient should be sent away to the country. It is essential that the treatment be strictly specific, patients sensitive to horse dander being treated with the protein of horse dander, and patients sensitive to horse serum being treated with the protein of the serum.

Desensitization to *food proteins* is much less successful, and is difficult to carry out. Very little experience has been obtained of desensitization by hypodermic injection of food proteins; they are usually administered by the mouth in pill form. Treatment can be commenced with one pill containing $\frac{1}{10}$ gr., the number of pills and the dose being gradually increased. It is difficult to understand how this method can be successful, owing to the digestive action in the alimentary canal, and Walker considers it useless in asthma, although other authors claim success. Rectal administration has been tried, and was recommended on experimental grounds by Besredka. Pagniez and Vallery-Radot give a very small quantity of the protein an hour before a meal containing that protein, and claim considerable success.

Vaccine Treatment.—A distinction must be made between the patients who give positive sensitization tests to bacterial protein and those who do not. The results are more successful in the former group. If possible an autogenous vaccine should be made; or, if not possible, an active stock vaccine of the same strain as the organism giving the positive test. Treatment should be commenced with very small doses, such as $\frac{1}{2}$ to 1 million. Injections should be made every five to seven days, the dose being cautiously increased, and care taken to avoid general reactions. A local reaction is favourable, and can be used as a guide to the suitable dosage. Out of 178 asthmatic patients treated with vaccines by Chandler Walker, 28 were sensitive to bacterial protein, and under vaccine treatment 75 per cent were relieved and 21 per cent improved; whereas of the non-sensitive cases, 40 per cent were relieved and 20 per cent improved. Similar results have been obtained by Rackemann and others. Walker, however, assumed a bacterial origin in all his cases which did not give positive dermal tests, and it is probable therefore that he included cases which were not bacterial in origin. He only used staphylococci and streptococci for his tests and treatment of the sensitive cases, though in the non-sensitive group a few were treated with vaccines containing Friedlander's bacillus, diphtheroids, and in one case *B. pyocyaneus*. His initial dose of 200 million seems to us far too large.

The cases which appear clinically to be caused by bacterial infection but do not give positive reactions require very thorough bacteriological investigation. Cultures should be made from swabs from the nasopharynx and from carefully collected sputum on various media. The sputum brought up immediately after an asthmatic attack should be especially investigated. Swabs and sputum sent through the post are useless, as the causal organism may die before cultures are made. It is important that cultures should be made as quickly as possible. The vaccine, whenever possible, should be made from young primary cultures. A mixed primary culture is usually preferable to one made from pure secondary cultures. As in the sensitive cases, treatment should be commenced with very small doses. A common fault is to give too large a dose, and we have seen many cases, which were doing badly under vaccine treatment owing to the doses being unsuitable, at once improve when smaller doses were given.

As asthma may be caused by focal infections at a distance from the bronchi, a careful examination must be made of the nose and its accessory sinuses, the throat, teeth, alimentary tract, and genito-urinary organs, for possible sources

of infection. If an operation on the nose seems advisable, vaccine treatment is a useful preliminary, and by removing the congested, œdematous state of the nasal mucous membrane may even make an operation unnecessary.

Vaccine treatment is also useful in cases which, although they give positive tests to some animal or food protein, are subject to secondary infections of the respiratory tract.

The results of vaccine treatment of non-sensitive bacterial asthma vary much with the experience of the physician in charge. Incomplete bacteriological examinations of stale sputum, the use of stock vaccines which may not contain the causal organism or may have lost their activity, and too large doses, have detracted from the usefulness of this method of treatment. In careful hands considerable or permanent relief should be obtained in half the cases, and some improvement in another quarter.

Non-specific Treatment.—Experiments have shown that a highly anaphylactic animal becomes more sensitive to those substances such as **Albumoses** and **Histamine** whose action resembles that seen in the true anaphylactic response, and that a non-fatal dose of these non-specific substances will make an animal less sensitive to the specific protein. Thus Dale has shown that a dose of **Peptone** not large enough to produce any pronounced reaction will inhibit anaphylactic shock, and thinks that this is in part due to the detachment of antibodies from the cells, so that they become free in the blood and can destroy the antigen. Auld had previously, on clinical grounds, used injections of peptone in the treatment of asthma. He regards its immunizing action as directed not against the antigen but against the antigen-antibody product which is the cause of the anaphylactic shock. Commercial peptone contains varying proportions of primary and secondary albumoses. Witte's peptone contains too much primary albumose, and Auld recommends Armour's No. 2 peptone. For adults he gives it intravenously in 5 per cent solution, but for children and elderly patients a 7·5 per cent solution intramuscularly. The peptone is dissolved in normal saline at 56° C., and very carefully neutralized with seminormal sodium hydrate or carbonate until the solution is faintly alkaline to litmus. It is then sterilized by heating up to 60° to 65° C.; 0·5 per cent phenol should be added as a preservative. The dose intravenously is 0·3 c.c., increasing by 0·2 c.c. every fourth day until 1·5 c.c. are given. In the first two weeks the doses may be divided, giving them on alternate days, so that 0·8 c.c. is given during the first week and 1·5 c.c. similarly divided during the second week. The doses for intramuscular injection are the same, but the 7·5 per cent solution is used. If the patient does well, the dose is not increased beyond 1·5 c.c., but this quantity is given twice weekly for three weeks. If the patient does not respond well and no reaction has occurred, the dose is increased to produce a slight general reaction. If, on the other hand, the patient shows sensitiveness early, Auld changes to Armour's 'peptone siccum', which contains a much smaller amount of albumoses, or to detoxified Witte's peptone (made by agitating with 97 per cent alcohol, filtering, and drying the residue). After a short course of either of these the No. 2 peptone is usually well borne. If in spite of this the result is not satisfactory, Witte's peptone is tried, either alone or mixed with peptone siccum or some other variety. Usually the treatment takes six weeks, twelve to fourteen injections being given, but occasionally treatment must go on for three months.

Gow uses a 1 per cent solution of Witte's peptone, and Coke begins with 3 min. of a 2 per cent solution, increasing the doses until 1 c.c. or more of a 5 per cent solution can be taken. Witte's peptone contains histamine, and its albumoses are very toxic. Even weak solutions must be used with great

caution. We prefer Armour's No. 2 peptone, as it is less likely to cause reactions. The aim should be to give a dose just short of producing a reaction. If the temperature rises above 1° after an injection, the next dose should not be increased. Cases of pure uncomplicated asthma of the sensitive type do best. They quickly respond, and the effect is more or less lasting. A number of patients appear to lose their sensitiveness permanently; others, while not responding well during treatment, improve later; whilst others improve, but relapse later and may require another course of injections. Some patients are very resistant and show no improvement. These last include long-standing cases with much bronchitis and emphysema. Peptone can be used in conjunction with vaccines in the bacterial cases. Auld prefers to give the peptone first, and, if this does not succeed of itself, the vaccine is used later. Or the vaccine can be given to alternate with the peptone injections, the vaccine being continued after the peptone treatment has ended.

Widal, Abrami, and Brissaud advocate giving peptone by mouth, and find that complete desensitization can be obtained by prolonged administration; 0.5 gm. is given an hour before a meal at varying intervals, as the patient's sensitiveness may direct.

Colloidal Metals have been used by some authorities. Boyd reports several successful cases treated with Typhoid Vaccine—50 million intravenously—and we have also seen improvement follow this course. Petersen and Miller also report successful cases with typhoid vaccine. Sterling has used non-specific Vegetable Proteins.

Injections of Horse Serum were once frequently used, but several instances of fatal anaphylactic shock occurred. Horse serum should never be injected into an asthmatic until skin tests with the serum have proved that the patient is not sensitive to its proteins.

Danysz's Vaccine.—Danysz, in seeking for an efficient anti-anaphylactic agent, started from his theory that the majority of chronic maladies were due to a chronic anaphylaxis to substances generated in the bowel. He uses a polyvalent vaccine of all the organisms growing in the intestines, and obtained from cultures in broth, and then isolated in pure culture on gelatin. The various pure cultures are mixed together in the proportion in which the bacteria were found to be growing in the bowel. The vaccine contains mainly coliform organisms and streptococci. He uses this vaccine in asthma and certain skin and gastro-intestinal diseases. Coke has had successful results with asthmatics. The initial dose must be small—even one million organisms may cause a reaction.

Although a non-specific protein treatment, the dose of such a vaccine is much less than that used, for instance, with typhoid vaccine to produce the same result. Experience with vaccine treatment has also shown that a *B. coli* vaccine is more toxic than a typhoid vaccine.

SYMPTOMATIC TREATMENT.

Adrenalin is the most useful drug for the treatment of an attack of asthma. It must be given at the onset of an attack, and not when it has fully developed. A dose of 3 to 5 min. subcutaneously is generally sufficient. Theoretically, **Atropine** should be useful; but, as besides its inhibitory action upon the bronchoconstrictor fibres it depresses the other actions of the vagus, its effects are unpleasant when given in the comparatively large doses required to stop an asthmatic attack. **Pituitrin** may be combined with adrenalin to prolong the effect. Chloral is useful in many cases. **Benzyl Benzoate** has been advocated, but has been found disappointing in practice. **Chloroform** or **Morphine**

may be necessary very occasionally in severe attacks which have not yielded to other remedies.

Between attacks, **Potassium Iodide** is probably the drug most often prescribed. It is more useful in the bacterial than in the sensitive cases. A dose of 3 gr. three times a day is usually sufficient.

Antispasmodic Sprays and Fumes may be temporarily necessary, but they undoubtedly aggravate infections of the mucous membranes, and more effective remedies should be substituted.

Between attacks, **Exercise** should be encouraged unless dyspnoea is caused on exertion because of other factors such as bronchitis and emphysema; and special **Breathing Exercises** are of great value.

Ramirez speaks well of **Diathermic treatment**. It is given for half an hour to one hour two or three times a week.

Asthma presents us with many unsolved problems, for the elucidation of which we demand more help from physiology, bacteriology, and biochemistry than these sciences can at present give; but the advances of recent years enable us to give the asthmatic a more hopeful outlook. In the words of Vander Veer, the rule of treatment to follow is: "Remove from the environment of the patient all causative factors that can be removed, and immunize him against all those that cannot otherwise be controlled."

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AURICULAR FLUTTER. (See QUINIDINE.)

BACILLURIA. (See BLADDER, BACTERIAL FLORA OF.)

BACK; PAINFUL. (See BONE AND JOINT SURGERY.)

BERI-BERI.

Sir Leonard Rogers, M.D., F.R.C.P., F.R.S.

J. W. D. Megaw and R. N. Banerji¹ describe two family outbreaks of the epidemic dropsy type of beri-beri in India, in the first of which 12 of 13 members of a family were attacked with gastro-intestinal symptoms, œdema of the legs, fever, cardiac dilatation, and nerve symptoms, with a tendency to hæmorrhages, with two deaths, while a relative visiting them was attacked within ten days of his arrival, too short a time for vitamin deficiency to arise.

The whole outbreak rapidly ceased when the rice they were eating was stopped and other diet substituted, although the earlier diet was not deficient in vitamins. The second outbreak was of a similar, but milder, nature. In a further lengthy paper, Megaw² discusses the whole subject of the etiology of beri-beri, and concludes: "In the present state of our knowledge beri-beri and epidemic dropsy cannot be distinguished from each other, and it is preferable to group them together under the old name beri-beri, though there is no harm in using such terms as 'the epidemic dropsy form of beri-beri' or 'ship beri-beri'. Avian polynneuritis, which is caused by deficiency of vitamin B, has not been proved to be the same disease as beri-beri. It is not safe to assume that attention to the supply of vitamin B is in itself a sufficient precaution against beri-beri. The known facts suggest strongly that a poison formed in rice under certain conditions of storage may be the essential cause of some forms of beri-beri, and possibly of the disease in general. A programme for the control of the disease should take into account (1) the manner of preparation and storage of rice, and (2) the supply of a nutritious and well-balanced diet, containing a sufficiency of all the factors which are essential to the nutrition of the body". H. W. Acton³ has also studied epidemic dropsy in Calcutta, which commonly occurs in the hot, humid months from July to September, and is associated, as shown by Greig, with high prices leading to storage of rice, which may result in changes due to bacterial fermentation, which Acton suggests may produce a poison of the nature of an amine.

W. E. Musgrave and B. C. Crowell⁴ also write at length on neuritis in the tropics with special reference to beri-beri, nearly all cases of neuritis in the tropics being first diagnosed as beri-beri, although the writers found 50 per cent of them due to other causes, such as physical agents, inorganic poisons, and alcohol. Among predisposing factors, a damp climate, race, sex, insanitation, and poverty are laid stress on: of the theories of origin, inorganic chemical poisons have received little support, the various infection views are not proved, and that of dietetic deficiencies still has most support, the effect of improved diets in checking the disease being given great weight. The pathology and symptoms are also discussed in detail. C. Fraga⁵ thinks beri-beri as seen in Brazil is an infectious disease and not a deficiency one, diet only being a predisposing cause. Two groups of nine convicts each, who volunteered for the experiment, were fed for a month or six weeks on hulled or sterilized rice without developing neuritis, while in the Bahia insane asylum arsenical preparations, such as *Nec-arsphenamin*, cured beri-beri comparatively rapidly.

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BILIARY PASSAGES, SURGERY OF. *E. Wyllys Andrews, M.D., F.A.C.S.*

W. J. Mayo,¹ after making clear the early leadership of English surgeons in biliary surgery, discusses the vast material of the Mayo Clinic—viz., 16,980 gall-tract operations in 32 years, with 2.6 per cent average mortality; 1920 common-duct operations gave 7.8 per cent mortality. The last decade gave a death-rate lower than the whole period, viz., 6.8 per cent and the last two years only 5.6 per cent. For the final year the duct operations showed but 3.8 per cent, and cholecystectomy but 1.6 per cent in 942 cases. This includes all deaths in the hospital, and naturally does not seek to exclude deaths from nephritis, cardiorenal disease, hepatic insufficiency, etc.

Three fundamental principles must be evaluated: (1) Mortality of operations; (2) Cure or benefit from operations; (3) Disability after operations.

Technique at the Rochester Clinic.—

The Incision.—This is slightly oblique, and extends at least to the level of the umbilicus. Occasionally the mid-line section is used or the lateral is made longer, especially if the caput coli is to be examined. The rectus belly is divided rather than the outer border followed. Transverse section of the rectus is only occasionally practised.

Exposing the Ducts.—This is the most vital point in the work. The chole-dochus is subject to anomalies. It may lie either wholly or partly inside the head of the pancreas, and its relations to the portal vein and hepatic artery are sometimes distorted by adhesions. The arteries of the gall-ducts, especially the cystic artery, are quite variable in location, number, and position. In isolating the cystic duct for removal the common duct has often been torn or cut, causing permanent fistulas. Not only may the cystic duct have inflammatory adhesions to the wall of the common duct, but it seems to take such a false position from congenital anomalies. Mayo warns against using sharp-toothed forceps in seizing it, lest their points tear a common duct which has this anomalous side-by-side contact. Ordinarily stones are easily extracted from the common duct. Probes should be pushed through into the duodenum if necessary.

Bile Drainage.—Following Mayo Robson and most experienced operators, the writer insists on the curative power of open drainage, especially if jaundice exists. Robson's method, hepatic duct drainage by a catheter, is praised highly.

Bile Fistulas.—These result mainly from carelessness in cholecystectomy, and call for a variety of difficult plastic operations for cure. The work is made more difficult by the absence of the gall-bladder. When carcinoma of the gall-tract causes obstruction and jaundice, whether a fistula has been made or not, a cholecystogastrostomy is a sure relief. Bile in the stomach causes only good results in these cases.

Preparation of Cholaemic Patients.—It may be inevitable that a jaundiced patient be operated upon. If this is found unavoidable, we are to meet the problem of combating hæmorrhage, renal insufficiency, hepatic insufficiency, dehydration, and cholangitis with cholecystitis. All these factors are in a measure interdependent. Blood-urea goes upward constantly. Dehydration may be combated by proctocolysis, hypodermoclysis, and intravenous injections. Alkalis and glucose can be taken up in large amounts by the colon. To forestall hæmorrhage, which is a factor in most fatal cases, transfusion and calcium medication are important. Wright first pointed out the calcium deficiency in hæmophilia. It became exhausted by combining with the bile acids and pigment in cholæmia. Cammidge and Robson, both clinically and experimentally, added to our knowledge of calcium deficiency and its correction. Although the rectum or stomach refuses to take up calcium salts freely, Lee and Vincent have shown the practicability of using it intravenously in 10 per cent solutions of the chloride with striking benefit in hæmophilia. Sanford has devised a simple and accurate method of estimating calcium in the blood. Blood transfusion alone will give a brief period in which the coagulation time is low enough for safe operating. As a result of these improvements Mayo states that no death from hæmorrhage has occurred in their biliary-tract surgery in the past two years.

Another contribution to biliary surgery comes from Sir John O'Connor,² of Buenos Aires. In general he advocates total gall-bladder removal. He emphasizes the value of blunt dissection of the organ from its bed, and describes his own technique in full. Continuous out-door treatment and getting the patient out of bed on the fourteenth day are a part of his management.

At the Glasgow meeting of the British Medical Association,³ Rutherford Morison and others discussed historically the evolution of gall-tract surgery and its present status. Articles written by him in 1895 are quoted, with a series in the years following, showing a remarkable agreement with present-day practice. From the earliest papers cholecystectomy, or cautery destruction of the gall-bladder, rather than simple drainage, was advised. The second paper was by Farquhar Macra, who also advocated surgical management and radical removal of diseased gall-bladders rather than mere stone extraction and drainage. In the discussion which followed, Wilkie of Edinburgh, Young of Glasgow, Novis of Bombay, Parry of Glasgow, and Handfield-Jones of London, were in substantial agreement with the original papers, especially as to therapeutic measures.

Cholecystectomy v. Cholecystostomy.—The problem of the removal versus drainage of the gall-bladder is still obscure as reflected in 1923 literature. Divergent and contradictory views of various clinics seem to rest on no very solid statistical proof. Walzel, of von Eiselsberg's clinic at Vienna,⁴ reviews a large section of their gall-bladder surgery to determine the value of removal or non-removal of the organ and also the problem of drainage versus primary closure of the abdominal wall. Some of the patients reported had associated stomach or duodenal surgery. The general conclusion is stated that careful judgement must be used in choosing cases to be left undrained. Unless this is done, in omitting the drains we may be 'playing with fire'.

K. Scheele⁵ reaches a similar conclusion, as does Ribas,⁶ who reports 64 cases of diseased gall-bladders removed in the Barcelona Clinic, October, 1920, to October, 1922. A series of photographs of the gross and microscopic lesions, some in colour, add to the value and interest of this report. Of these gall-bladders, 21 had calculi, the remainder non-calculous disease of various types—cancerous, typhoid, gripal, of colon bacillus origin, and simple stasis from mechanical pressure on duct; 8 were secondary to pancreatic lesions, 1 to hydatids of the liver, and 4 cases had painful distention with cholesterol deposits in the granulation of the epithelial lining; there was jaundice in 26 cases, fever and acute sepsis in 22, hæmatemesis in 2, and melæna in 2; collapse and cardiac failure, with a large calculus, demanded an emergency operation in one case. Radioscopic examination helps in only part of the cases. Surgical intervention should be advised before hepatitis, pancreatitis, myocarditis, and other complications are confirmed. Cirrhosis follows ultimately in these organs if the cholecystitis or cholangitis becomes chronic. Surgical intervention includes exploration, extirpation of diseased gall-bladder, or removal of stones from the ducts; but in bad surgical risks the restorative value of drainage should not be ignored, as it alone may save life, abolish toxæmia, and raise the patient to a level of strength where more radical operations are possible.

Sherren, of London,⁷ reviews the question of cholecystostomy versus cholecystectomy. In an early series, 184 cholecystectomies gave 6 deaths, while 152 cholecystostomies gave 4 deaths, with 29 recurrences; in addition, 5 cases died of carcinoma within four years, making 34 recurrences. Thus the results were far better with the ectomies, and with scarcely greater mortality. Sherren, therefore, concludes that cholecystectomy is surer and safer and without injurious effects.

Hartman⁸ re-examined 100 patients whose gall-bladders he had removed. Of these, 92 per cent were without recurrence of trouble. One had later a stone in the common duct requiring a second operation. Only 2 per cent had troublesome adhesions, but over 8 per cent had appendicitis complicating cholecystitis, showing the importance of examining the appendix during the gall-tract operation.

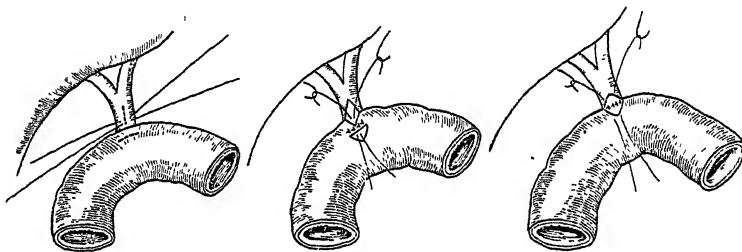
Hoffman⁹ reports several cases of *secondary bile leakage* after ten to twelve days, and asks: "Why is a cystic duct ligature insufficient?" Arteries remain sealed when tied, especially large vessels with a thick muscular coat. The cystic duct, as he shows by sketches, has no muscular wall, but only a thin fibrous canal with thick mucosa. The ligature cuts through and causes necrosis, so that if near the bifurcation, back-pressure of bile can easily force the tissues apart when the distal stump falls off. For safety he recommends a sort of infolding or stump with very light pressure rather than a very strong, tight ligature. Hoffman also has devised a method of tying a knot in the duct itself.

Morley¹⁰ reports two cases of *congenital cyst of the common duct*. One of these died after operation, and one was discharged well and has remained so. Of this rare anomaly Morley found only 39 in the literature, making, with his two, 41 recorded cases. The pathology is usually the same—a dilatation like an aneurysmal sac of the common duct, including sometimes the cystic. The wall is commonly sacculated, jaundice commonly occurs and is intermittent, and pressure ileus results as the cyst grows to the size of a man's head, which most of them have done. Age and sex are important in the etiology, most cases beginning before 12 or 14 years, and being in girls. Early symptoms are pain, followed by tumour displacing the liver upward, exactly as in cystic disease of the liver or pancreatic cyst. The disease is more painful than hydatid liver cyst, and usually the mass is less movable on palpation. Treatment has been deplorably unsuccessful and fatal, because attempted too late or on wrong lines. Such cysts cannot be extirpated. Out of 22 treated by open drainage or efforts at removal, 20 have died. When abscesses have been found or outside drainage employed, only temporary results have followed. Drainage into the alimentary canal is the only rational operation. In 10 cases treated by primary or else two-step cholecystenterostomy, there were 6 recoveries. Of the 4 deaths, Morley thinks several could have been avoided by better technique, and he recommends that all future cases be treated by primary lateral cholecystoduodenostomy, without temporary external drainage. In this connection we may mention that the past year has seen the publication of three other papers on this somewhat rare anomaly—viz., by Elisher,¹¹ Karl Ziff,¹² and Duboucher.¹³ Erik Walker¹⁴ in America also published early cases six years ago.

Meulengracht,¹⁵ of Copenhagen, has studied the *differential diagnosis between dyspepsia from gall-stones and that of gastro-intestinal origin*. He called 230 patients operated on for gall-stones at the Bispebjerg Hospital during the years 1913–22 for re-examination. Of 128 whose gall-stone diagnosis had been verified by operation, 31 had been diagnosed correctly at the end of the first attack; 63 for a long period, in some instances ten to twenty years, had their affection diagnosed as a gastro-intestinal, nerve, heart, or kidney disease; and from 24 no reliable information could be obtained; 101 had entered the surgical division under the diagnosis of cholelithiasis, and the remainder under the diagnosis of appendicitis, gastric perforating ulcer, abdominal or renal colic, etc. The subjective symptoms of dyspepsia due to gall-stones are similar to those of other forms of dyspepsia, but they differ in their inconsistent and irregular appearance. Dyspepsia from gall-stones is characterized by its sudden changes, improvements, and aggravations. It is not influenced by dieting. Examination for manifest and occult jaundice, for bile pigment in the blood and urobilin in the urine, is a valuable aid in the diagnosis. Achylia is a symptom in advanced stages, also in other diseases, and should be considered in connection with cardialgia and tenderness in the epigastrium.

Problems of repair of the common duct by various methods are summarized

by Sercene and D'Allanes¹⁶ in a report of 52 cases operated upon by the rubber tube implantation technique. The author recognizes three operative methods to re-establish the continuity of the principal bile-duct—viz., direct suture of the extremities of the sectioned canal, anastomosis with the duodenum or stomach, and anastomosis of the gall-bladder to the intestine. To-day, in addition to these procedures, there are three others from which to choose: (1) Suture of the two ends of the divided bile-duct over a rubber tube; (2) Hepato-duodenal or gastric implantation over a rubber tube, with suturing of the bile-duct and intestine in one or more places; (3) Reconstruction of the bile-duct by means of a rubber tube implanted in the stomach or duodenum without direct suture. The author reviews and discusses the cases reported in the literature in which these methods were employed. In the 16 cases in which the first method was used, there were 7 operative recoveries, 5 later recoveries, 1 incomplete recovery, 1 complete failure, and 2 deaths. The use of the second method in 13 cases was followed by 1 immediate and complete recovery, 5 late recoveries, 2 incomplete recoveries, 1 unknown result, and 4 deaths. The third method is easier than the others and its results were better; the 23 operations were followed by 2 unknown results, 1 partially successful result, 2 recoveries lasting for twenty-six and eight months respectively, 14 complete recoveries, and 4 deaths.



Figs. 11, 12, 13.—Choledochenterostomy—Flörcken's operation.

Another paper on duct repair comes from the Frankfort Clinic of Prof. Flörcken.¹⁷ Recognizing that hepatic duct drainage, as advocated by Moynihan and Kehr, is sometimes followed by fistula, he describes various methods of duct repair and by implantation. Thus the union may be lateral, or end-to-side, between duct and duodenum. In 16 cases Kehr reported using the hepatic duct eight times. The common duct should be employed whenever possible.

Flörcken has had best results with a technique combining both splitting and end-to-end union with the intestine. The illustrations (Figs. 11, 12, 13) show how the choledochus is both split and its end inserted into the bowel, where it is held by fine sutures. The wound is closed with a loose drain extending into the foramen of Winslow.

Sir Berkeley Moynihan¹⁸ discusses the *early signs and remote causes of cholelithiasis* in a recent careful review. He favours early and complete removal of the gall-bladder instead of the early palliative methods. Infections have many avenues of reaching the gall-tracts: ascending from the duodenum, descending from the liver, hæmatogenous from the blood-stream. The lymphatic route is also one by which micro-organisms reach these tracts from pancreas, stomach, or intestine. In ulcer of duodenum or stomach, infections also travel by direct continuity along the ducts to the gall-bladder. He concludes, therefore, that the infections travel and locate here with almost equal

PLATE VI.
GALL-BLADDER PATHOLOGY
(PROFESSOR WILLIAM BOYD)

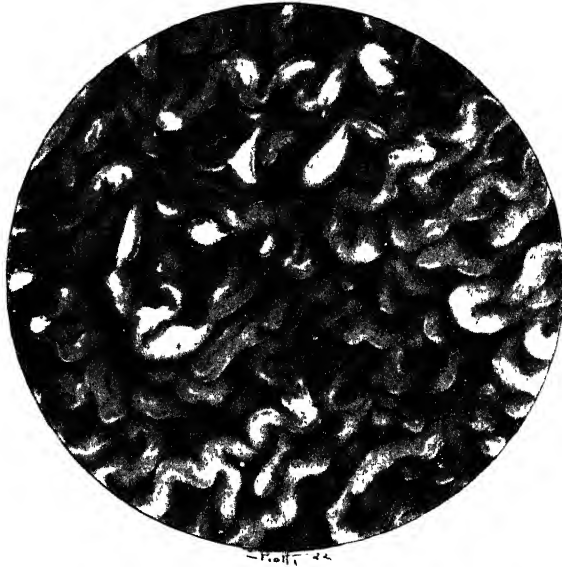


Fig. A.—Mucous membrane of a strawberry gall-bladder at an early age.
The patches of lipid are whitish in colour.



Fig. B —Deposits of lipid stained with osmic acid.

PLATE VII.

GALL-BLADDER PATHOLOGY—*continued*

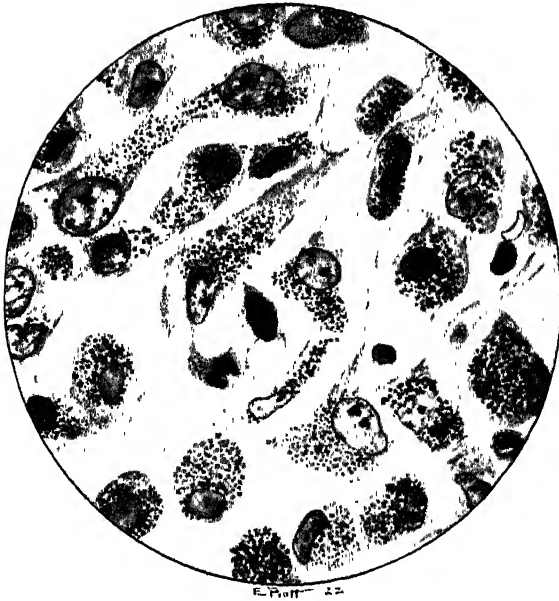


Fig. C.—Inflammatory cells packed with lipid granules. High power.

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frequency on the mucous or on the peritoneal surfaces, and, of course, involve all the coats of ducts and gall-sac. Moynihan thinks fatty deposit is an early sign of local infection, and compares this condition with similar deposits in the diseased appendix, or in diverticulitis of the sigmoid colon. Gall-stones are a secondary, not a primary, factor in biliary infections—a result, not a cause, of inflammation. Hence he repeats his famous aphorism: "Every gall-stone is a tombstone erected to the memory of the organism dead within it." The paper includes reports of cholesterol estimation in the blood by Dr. McAdam, who found cholesteræmia a constant factor, and studies of the histologic pathology of the gall-bladder wall by Dr. Gruner, showing progressive microscopic changes in all its coats during the progress of the disease.

Professor William Boyd,¹⁹ of the University of Manitoba, also publishes a careful study of *gall-bladder pathology*, based upon research with the dissecting microscope, staining reactions, the polarizing microscope, microchemical reactions, etc. Like Moynihan, he considers all possible routes of infection, especially the lymphatic routes, and the causes and relation of lipid deposits. We reproduce several photomicrographs from this excellent work, showing clearly the form and position of lipid deposits in what he terms the strawberry gall-bladder. *Plate VI, A*, shows them *in situ* in the rugæ of the interior, and *Plate VI, B*, more magnified, their appearance under the intact epithelium when stained with osmic acid. Other staining agents, such as Scharlach B or Lorrain Smith's Nile blue sulphate method, are also essential in lipid. These methods, with the binocular dissecting and the polarizing microscope, are essential, he thinks, to a proper study of the gall-bladder diseases. With such instruments of precision, employing also microchemical reactions, Boyd follows cholesterol and lipid deposits in the various layers of the organ, and traces their position in relation to chronic and acute cholecystitis. They are seen (*Plate VII, C*) mingled with the inflammatory cells, and even forming polypoid masses which become nuclei of gall-stones. The cause of lipid deposit is not yet determined, but its relation to gall-stone formation is evident, as are the presence of micro-organisms and increased cholesterol in the bile. Boyd's researches include studies of comparative anatomy (cat and dog), and a large series of dissections and feeding experiments on rabbits, making the whole paper a valuable and original contribution.

Seelig²⁰ discusses *anomalies of the ducts* as an obstacle and danger in cholecystectomy. Particularly the danger of mistaking the common duct for the cystic is pointed out (*Fig. 14*). A number of surgeons are reporting similar cases, as Homans, of Boston.²¹ Seelig considers this anomaly a danger in operating and a factor in causing cholecystitis.

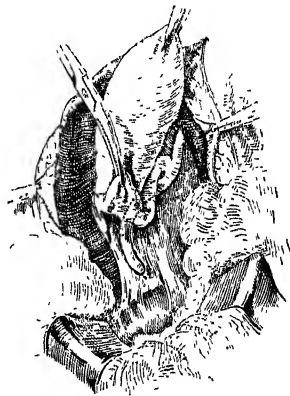


Fig. 14.—Anomalies of the bile-ducts. View of the operative field showing that what was at first supposed to be cystic duct was in reality the common duct.

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1923, Jan. 24, 615; ¹²*Presse méd.* 1923, April 14, 346; ¹⁴*Ann. of Surg.* 1917, 446; ¹⁵*Ugeskr. f. Læger*, 1923, April 12, 247; ¹⁶*Jour. de Chir.* 1922, Sept., No. 3; ¹⁷*Arch. klin. Chir.* 1923, April 12, 49; ¹⁸*Brit. Jour. Surg.* 1923, Jan., 127; ¹⁹*Ibid.* 337; ²⁰*Surg. Gynecol. and Obst.* 1923, March, 331; ²¹*Ibid.* 417.

BLADDER, BACTERIAL FLORA OF, IN GYNÆCOLOGICAL CASES.

W. E. Fothergill, M.D.

A. Gough¹ placed a single drop of the urine obtained by catheterization of patients before operation in a tube of culture medium, and noted the number of colonies after forty-eight hours' incubation. This was done in 100 unselected cases in which no complaint of urinary symptoms had been made: 30 cases were sterile; 39 cases showed less than ten colonies; 21 cases showed between ten and one hundred colonies; 10 cases showed over one hundred colonies. The varieties of organisms found were: *Staphylococcus albus*, 56; *S. aureus*, 1; streptococci, 1; diphtheroid bacilli, 17; coliform bacilli, 12; *B. proteus*, 1. In the cases with over one hundred colonies, the varieties were: Coliform bacilli, 8; *B. proteus*, 1; *Staphylococcus albus*, 1. The figures showed an increasing probability of infection with the advance of age in the patient. Most organisms were found in cases of prolapse with cystocele, and in cases of pelvic infection. It is known that *S. albus* and diphtheroid bacilli are normal inhabitants of the urethra. The catheter will carry some of these up on its point, and this will account for cases in which but a few colonies are found. But the cases with over one hundred colonies Gough takes to be due to definite infection of the bladder. A small amount of pus was indeed found in 6 out of the 10 cases. After operations, cystitis is a frequent and annoying complication. When it occurs there is a tendency to blame the nurses. But the retention of urine and lowered resistance of the tissues after operation may be quite sufficient to give an opportunity to germs already present. Similar conditions account for the occurrence of cystitis and pyelitis during pregnancy and the puerperium.

Leith Murray² made a similar investigation directed towards coliform organisms only, using a selective medium in the first instance. Before operation 42 per cent gave a positive result, and after operation 92 per cent were positive at the first catheterization. The organisms all lay within the four groups of MacConkey's classification of *B. coli* *verus*. In a series of 12 cases of non-infective gynæcological disease, intra-abdominal puncture of the bladder was carried out; and in 4 cases coliform organisms were recovered. Apparently, therefore, at least 25 per cent of female urines contain a saprophytic coliform organism producing no symptoms. Leith Murray considers that in the absence of pus there is no real pathological significance in the demonstration of coliform organisms in female urines, and that the cure of an infective condition should be regarded as complete when pus is no longer present, however markedly the bacilluria may still persist.

REFERENCES.—¹*Jour. Obst. and Gynæcol. Brit. Emp.* 1923, No. 1, 102; ²*Ibid.* 1912, Aug.

BLADDER, DISEASES OF. (See also BLADDER, BACTERIAL FLORA OF, IN GYNÆCOLOGICAL PRACTICE; BLADDER, GROWTHS OF; INCONTINENCE OF URINE.)

Sir John Thomson-Walker, F.R.C.S.

Intraperitoneal Rupture.—Thomas¹ states that the absence in the posterior or peritoneal wall of the normal bladder of a sufficient laxity for easy or secure suturing, is an important source of difficulty for the closure of an intraperitoneal rent, which is so often situated very low down in the pouch of Douglas. The interference of loops of gut, together with the inadvisability in such a condition of the adoption of the Trendelenburg position, is a further difficulty. The author considers, however, that free escape of urine into the peritoneal cavity,

through an intraperitoneal rupture, will not necessarily lead to a fatal peritonitis. Free suprapubic drainage of the pouch of Douglas, together with Murphy's method of enterocolysis and the adoption of the Fowler position, may lead to recovery.

Urinary Disturbance due to Hydatid Cyst.—Deming² has collected 114 cases of hydatid cyst of the pelvis, most of which had urinary disturbance and 48 of which developed complete urinary obstruction. The cysts develop in the retroperitoneal cellular tissue between the bladder and the rectum and cause distortion of the posterior urethra, bladder neck, and ureters. Growth is slow, and there is usually a long latent period without symptoms, then difficulty of micturition which slowly leads to complete retention. Frequency, straining, and pain in hypogastrium, perineum, or back are present. Spontaneous infection occasionally takes place, leading to death, or rupture of the cyst into rectum or bladder with discharge of its contents. An abdominal hypogastric tumour, usually median, and unaffected by catheterization, is almost constant. The above history in the presence of such a tumour, together with the examination of the fluid obtained by inserting a long needle through the perineum directly into the cyst with a finger in the rectum as a guide, and if possible the taking of a complement-fixation test, should lead to a correct diagnosis, especially if the cyst after aspirating is filled with thorium.

Marsupialization of the cyst is the treatment of choice, while incision with suture of the cyst wall to the edges of the abdominal wound gives good results. Of the 48 cases 7 were untreated, and of the remainder 25 recovered and 14 died; 1 developed incontinence and 1 was relieved. Of those operated upon, 60.9 per cent were cured. Error in diagnosis was responsible for 50 per cent, and secondary infection produced by suprapubic or rectal puncture was the cause of 40 per cent, of the mortality.

Diverticula.—Gayet and Gauthier³ state that vesical diverticula found at the apex of the bladder are undoubtedly of congenital origin and arise from the urachus. Those in the neighbourhood of the ureteric orifices are congenital, arising from ureteral buds derived from the Wolffian duct. The exaggerated saccules found in chronic retention the result of mechanical obstruction are undoubtedly acquired.

The earliest symptoms are those of chronic incomplete retention; with the addition of infection, those of an intractable cystitis are added. An attack of hæmaturia, acute retention, or lumbar, abdominal, or perineal pain may first draw attention to the condition. Double micturition, the second being turbid or even purulent, together with a large quantity of residual urine, and great difficulty in obtaining a clear medium by bladder-washing, are very suggestive, but cystoscopy is necessary to confirm the diagnosis.

To determine the size and relationship of the diverticulum, X-ray photographs should be taken with an opaque ureteric catheter in the diverticulum, or after filling the bladder with an opaque medium and taking two photographs, the first with the bladder and diverticulum full, and the second after the patient has either passed water spontaneously or had the bladder emptied by catheter. In Hinman's contrast method the bladder is filled with an opaque medium, and this is gently removed by a two-way catheter, and, while removing the medium, air is introduced.

The authors recommend **Total Extirpation** of the diverticulum through a suprapubic incision with a combination of intravesical and extravesical manipulation. In all such operations double drainage, vesical and perivesical, is essential.

Hyman⁴ finds *diverticula of the bladder in children* to be of rare occurrence. In 600 cases of bladder diverticulum, only 30 cases occurred below the age of

10. The author holds that a congenital predisposition exists, but that the size of diverticula is much increased by any factors causing marked vesical distention, or increased activity of the bladder musculature. He found no recorded case of diverticulum in a female child. Hyman⁵ reports three cases in males 9½ years, 9 months, and 3 years of age respectively, the diverticulum being related to a ureter in each. No vesical or urethral obstruction was found, but pressure on the ureter by the sac caused obstruction, with dilatation above. Pyuria and residual urine were present in each case. Extirpation of the sac, with division of the ureter and re-implantation, was performed in all three cases.

Pleschner⁶ reports 12 cases of diverticulum of the bladder, in 8 of which the prostate was abnormally large or small, and he thinks that the diverticulum probably develops with advancing years. While some cases require operative treatment, in others local non-operative measures alone may considerably improve the patient's condition.

Exstrophy.—Scholl⁷ states that it is difficult to estimate the relative frequency of malignancy in exstrophied bladders as compared with those normally situated. In 387,000 patients at the Mayo Clinic there were 69 with exstrophy of the bladder, and in 3 of these the condition was malignant. Exstrophied bladders that are subject to constant irritation and trauma have an extensive glandular covering, the result either of metaplasia from the normal covering or of hyperplasia of glands in the mucosa. Such glandular structure often shows characteristics approximating malignancy. In 9 cases of exstrophied bladder in which material for histological examination was available, 2 were definitely malignant, and 2 showed atypical cellular formation varying markedly from the normal. In the reported cases of malignancy of exstrophied bladders, which are relatively frequent, the growths were adenocarcinomas. This glandular malignancy is the type that would develop from irritation and hyperplasia of glandular structures.

Dupont⁸ describes a case of cancer in exstrophy of the bladder in a man of 38, who had worn an iron receptacle to collect the urine. The man succumbed to intercurrent erysipelas and pneumonia. Of the 12 cases he has found on record, 4 were given radical operative treatment; of these, 1 died, and the ultimate result is not known in the others. These epitheliomata are slow growing, and in the author's opinion promise well for surgical treatment.

Lower⁹ considers that *Transplantation of the Ureters* is an operation urgently indicated in malformations, congenital or acquired, in which the bladder no longer acts as a reservoir for the urine, or in which the urine causes intolerable irritation; in injuries resulting in permanent damage to the vesical sphincter in which repeated attempts at plastic repair have failed; and in some cases of neoplasm involving the ureteric orifices. The best site is submucous implantation of the ureters into the sigmoid colon or into the rectum. Coffey's, Stiles', and Martin's methods are efficient modes of implantation. Important points in the technique are the pre-operative estimation of renal efficiency, and careful clearance of the bowel, the use of the Trendelenburg position, and, after operation, of a rectal tube. Two weeks' interval is, as a rule, required between implantations, and Lower himself prefers the intraperitoneal route.

Congenital Rectovesical Fistula.—Cristol¹⁰ reports a case in which the fistula was approached through the perineum and was found to be too high up for suturing. The rectum was freed and brought down after separation from the bladder. The fistulous opening in the bladder was closed by the raw surface of the rectum, and as a result of regular dilatation of the anal orifice spontaneous healing occurred. A year later the infant was seen in a cachectic state with gumma of the testis, which rapidly cleared up under treatment.

The author considers that syphilis is an important etiological factor in all such cases.

The Bladder in Tabes.—Corbus and O'Connor¹¹ discuss the tabetic bladder in those cases in which the specific tabetic process has become apparently dormant while the urinary abnormality gradually increases in severity. They conclude that in the uncomplicated tabetic bladder case, even when a residual urine of from 900 to 1000 c.c. is present, if the blood-urea nitrogen is normal, the bladder should be left undisturbed, treatment being systemic alone—intensive intravenous neo-arsphenamin injections, followed by spinal drainage, with mercury injections or inunctions; or spinal drainage without lumbar puncture by the hypertonic saline method, which they find to be superior to all other methods of introducing arsenic into the subarachnoid space. Local treatment is instituted only in the presence of complications. Forced fluids and urinary antiseptics are valuable in the earlier cases. In badly infected cases periodic catheterization and bladder lavage may alleviate the symptoms. With a considerable quantity of residual urine causing nocturnal incontinence, bladder lavage with emptying of the bladder when the patient goes to bed may control the incontinence. In the most debilitated patients, the insertion of an indwelling catheter, with lavage of the bladder twice daily and subsequent periodic catheterization, may improve their condition.

Contracted Bladder.—Paschkis¹² describes 18 cases of contracted bladder due to a variety of causes. He found that, with failure of local non-operative treatment, the only alternative was a suprapubic cystotomy, together, in many cases, with suture of the ureter to the skin, thus excluding the bladder, and at a later date performing a plastic operation if feasible.

Protein Sensitization of Bladder.—Duke¹³ describes a case of a patient troubled with frequency and burning micturition with no abnormal findings after careful urological investigation, in whom the urinary symptoms were shown, by intracutaneous tests with a number of food proteins, to follow with marked severity the test for wheat protein and to a less extent that for several other grains. As the result of avoiding all grains, especially wheat and its derivations, the patient has, the author states, been completely free from bladder disturbance for several months, except for three attacks, each lasting several hours, which followed the eating of a small amount of wheat flour taken on two occasions as a clinical test and after the subcutaneous injection of 0.01 mgrm. of wheat protein.

Vesical Ulcers.—Hunt¹⁴ discusses 'submucous' ulcer of the bladder and its surgical treatment. The lesion is usually on the dome and lateral walls of the bladder, and the urinary tract is usually free from infection. The cause is probably a blood-borne infection, similar to gastric and duodenal ulcers. He thinks the work of Bumpus and Meisser, who demonstrated the selective affinity of certain strains of streptococci for the urinary tract, to be significant as showing that submucous ulcer and other infections of the urinary tract may be due to foci harbouring streptococci. The extreme irritability of the bladder is but little benefited by lavage or local applications. In 20 cases treated at the Mayo Clinic by excision, the immediate results were excellent, but ultimate cure was not always obtained. Many of the reports in the literature are based on the immediate rather than on the late results. The author considers that the large number of patients obtaining permanent or temporary relief justifies wide excision of the inflammatory area, together with the removal of all foci of infection about the teeth, tonsils, and accessory sinuses of the nose.

Kretschmer¹⁵ describes 14 cases of 'elusive ulcer' of the bladder, 8 of which were operated upon; of these, 6 have remained free of symptoms, 1 has relapsed, and another has pus in the urine with a staphylococcal infection. Two cases

treated by fulguration had immediate relief of symptoms, but insufficient time has elapsed since the operation to tell whether such relief will be permanent.

The character and treatment of ulcers of the bladder is discussed by Keyes,¹⁶ who groups them into three classes; (1) Tuberculous ulcers; (2) Ulcers of the so-called Hunner or elusive type; (3) Incrusted ulcers.

The incrusted ulcer is apparently due to some special type of coccus infection, and is often located in or about the trigone. Clinically, and on cystoscopy, carcinoma is simulated, but frequently such an ulcer is curable by local applications of argyrol or *B. bulgaris*.

The elusive ulcer occurs in the mobile portions of the bladder distant from the trigone, and may be associated with tuberculosis and sometimes with pyelitis and generalized cystitis, but it has yet to be proved that this type of ulcer is not the residue of a generalized cystitis rather than a specific entity. The submucous infiltration associated with such ulcers becomes widespread, and as the result of bladder activity the mucous membrane cracks readily when stretched; hence the tendency of the symptoms to become gradually worse. The condition may subside or disappear as the result of a great variety of treatments, varying from the mildest antiseptic irrigations to resection of the ulcer with suprapubic drainage.

Vesical ulcers due to chronic tuberculous cystitis are more often than not the result of a mixed infection, and provided that the primary focus has been dealt with, many forms of treatment may succeed in the cure of the local condition—e.g., the administration of sandalwood oil by mouth, the instillation of corrosive sublimate, iodoform in oil, or carbolic acid. Vesiculectomy or cauterization with silver nitrate or the fulgurating electrode, and finally, in some cases, the author states, securing the immobilization of the bladder by catheter drainage, suprapubic drainage, or ureterostomy, may be successful in intractable cases.

Writing on "incrusted ulcer of the bladder", Paschke¹⁷ states that, in the few reported cases on record, quite a large proportion had developed after a childbirth, and that in one of his twelve cases the first symptoms appeared after a puerperal pelvic peritonitis. He regards incrusted ulcer as a morbid entity of unknown cause, distinct from incrusted cystitis; and, omitting the puerperal group, there had been preceding disease of the kidney or ureter in every case. Eight of his twelve patients were males.

Syphilitic Disease of Bladder.—Farage¹⁸ describes two cases, both in married women. There were no symptoms beyond polyuria, no history of syphilis, and there had never been appreciable manifestations of the disease; but on cystoscopy minute grey nodules were seen scattered over the mucous membrane of the bladder, each with a red halo, but no ulceration. In both cases the symptoms subsided and the nodules disappeared promptly under mercurial and arsenical treatment.

Cystoscopic Appearances in Tuberculosis of the Urinary Tract (Plate VIII).—Girling Ball¹⁹ says the changes seen in the bladder are of great importance in the diagnosis of renal tuberculosis. The earliest cystoscopic appearance is the discharge of blood, pus, or caseous material from the ureteric orifice; this may not be distinguishable to the naked eye and can only be proved by bilateral catheterization, for at this stage the bladder mucosa frequently shows no change. The degree of involvement of the bladder wall is an indication of the extent of the disease in the kidney. The earliest changes are usually found around the ureteric orifice, or over the vesicle or prostate. In renal cases the lips of the ureteric orifice become swollen, hyperæmic, œdematous, and may have semi-translucent bullæ around them. Dilated vessels arranged in a flamelike fashion, or even more extensive submucous hæmorrhage, may be observed. These

PLATE VIII.

CYSTOSCOPICAL APPEARANCES OF TUBERCULOSIS

(W. GIRLING BALL)

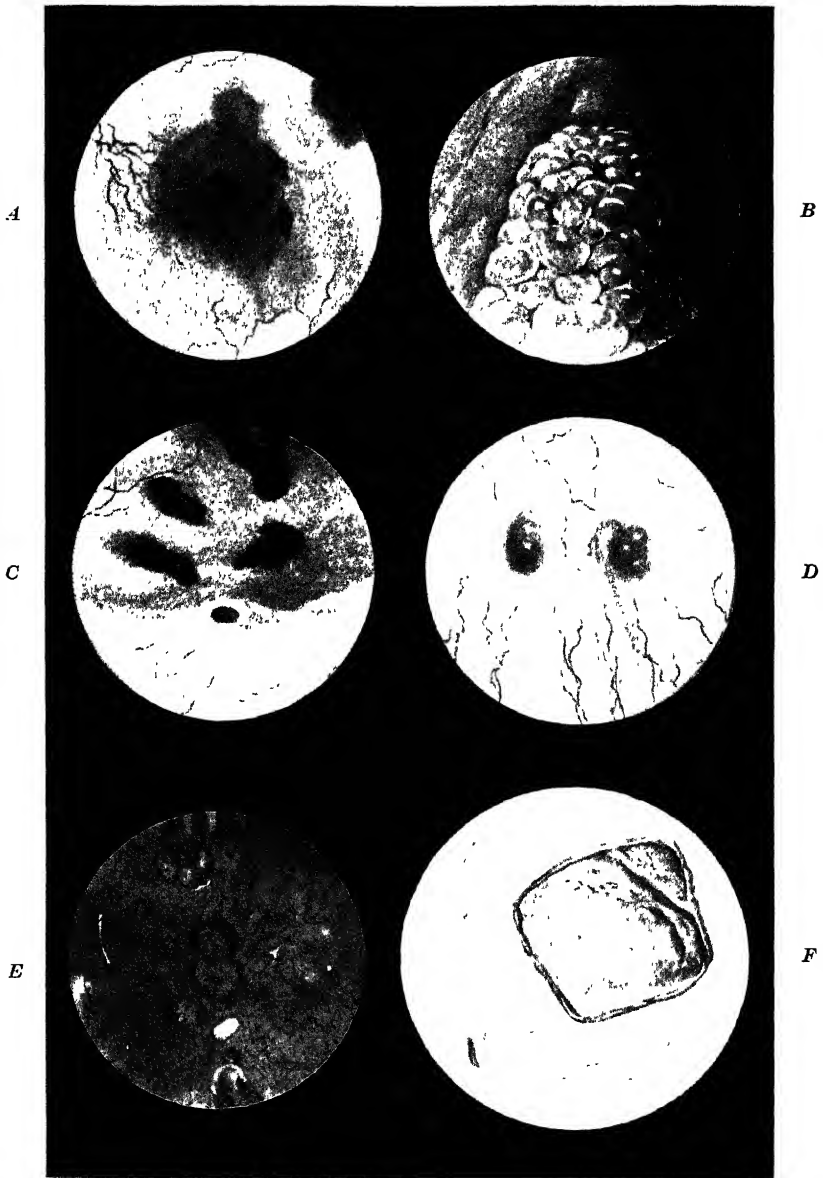


Fig. A.—Congested ureteric orifice. *Fig. B.*—Edema of ureteric orifice. *Fig. C.*—‘Golf-hole’ ureteric orifice with hemorrhagic patches. *Fig. D.*—Tubercles of mucous membrane. *Fig. E.*—Tuberculous ulceration with surrounding inflammation. *Fig. F.*—Tuberculous ulceration without surrounding inflammation.

Reduced from ‘The British Journal of Surgery’

PLATE IX.

CAVERNOUS ANGIOMA OF THE BLADDER

(HUBNER)



On the posterior wall, below the air-bubble, widespread angiomatous changes
have taken place in the vessels.

Drawing from the 'Archiv für Klinische Chirurgie

changes are not pathognomonic of a tuberculous infection. Miliary tubercles, the characteristic lesions of tuberculosis, are not seen so commonly as might be expected. They are usually situated around the ureteric orifice, and in the early stages of vesical infection the rest of the bladder mucosa remains normal. Later these tubercles break down and leave small shallow ulcers. The mucosa surrounding these ulcers may be normal, or there is a deep zone of congestion, while there may be an appearance of healing at one edge of an ulcer which is spreading in another direction. The ulcers may heal completely, leaving weak cicatrices. The ulcer may be deeply excavated, especially with the primary origin in the vesicle or prostate. Rarely, papillomatous masses may be seen. The areas of tuberculous cystitis have a tendency to remain localized, until the advent of a secondary infection, when the mucosa of the bladder wall between the tuberculous lesions exhibits changes associated with a chronic cystitis of pyogenic origin. The golf-hole ureteric orifice, through which there is no discharge, drawn up to a higher level than the orifice of the opposite side, is the common appearance seen in the case of a long-standing active, or a calcified, tuberculous kidney.

Suppurative Pericystitis.—Chute²⁰ reports 5 cases of this condition, 4 of which followed traumatism of the deep urethra, and 1 occurred after suprapubic cystotomy. A sign which is pathognomonic in this condition is a recently developed suprapubic tumour which is tender and unaffected by emptying the bladder, together with general signs and symptoms of septic infection. He recommends opening up the perivesical space and draining the cavity by tubes brought out through the perineum via the ischio-rectal fossæ as well as by tubes introduced from above, and it is usually advisable to combine this with suprapubic drainage of the bladder. In cases presenting a tight stricture, severe traumatism of the urethra, or suppuration of the perineum, perineal section should be performed in addition. These patients are usually very septic, and administration of normal saline in large quantities is of great help.

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BLADDER, GROWTHS OF.

Sir John Thomson-Walker, F.R.C.S.

A large number of articles on growths of the bladder have been published recently. Serial collation of these would involve useless reiteration of identical points, and would, moreover, necessitate such rigid condensation that no adequate idea could be gained of the valuable work contained in the articles. It is thought better, therefore, to extract the conclusions and results of treatment and place them under common headings. For the more detailed discussions of methods and views, the reader is referred to the original articles.

DIAGNOSIS.—Hübner¹ describes and illustrates *cavernous angioma of the bladder*. The true angioma is a very rare tumour of the bladder, and the diagnosis in some of the published cases is open to doubt, there being a lack of definition from the so-called varicose veins of the bladder. Varices of the bladder are of comparatively frequent occurrence cystoscopically, and have been described post mortem. In such cases there may also be varicose veins of the lower extremities, rectum, œsophagus, and stomach, and varices are frequent in the bladder in pregnancy. Cystoscopically, varicose veins

appear in dull-blue serpiginous folds, usually near the neck of the bladder and extending over a large area but without the defined character of a growth. In varices of the bladder even severe hemorrhage ceases spontaneously. Symptomatic treatment only is necessary, and radical operation is rarely required.

The published cases of cavernous angioma of the bladder are epitomized. Only three cases were examined microscopically, and in five cases examined cystoscopically no microscopical examination was made. Hübner describes a case observed by himself. A girl, age 11, had hæmaturia for five years which had recently become very severe. She was blanched and thin. Cystoscopically, on the posterior wall, behind the air-bubble, there were stellate veins projecting like a string of pearls on the surface of the bladder (*Plate IX*). This altered area of mucosa extended to the anterior wall, and reached to within 3 cm. of the right ureteric orifice. The bladder was opened and several nodules were excised, which on microscopic examination had the character of a cavernous angioma.

Kiellenthner² draws attention to various errors that may be made in the cystoscopic diagnosis of bladder tumours. Blood-clots in the bladder, cystic dilatation of the lower end of the ureter, and protrusion of the bladder wall inwards as the result of pressure by some uterine tumour or an ovarian cyst, may be mistaken for a tumour. A calculus in the bladder may simulate a tumour, especially when thickly coated with fibrin and clots, or a tumour encrusted with phosphate may resemble a calculus. Swelling of the entrance of a diverticulum may be mistaken for a tumour, as may also the lesions of tertiary syphilis. A case of gumma of the bladder is described.

Kidd³ considers that the diagnosis between simple and malignant growth is best made by the duration of the symptoms compared with the size and appearance of the tumour, the length of the fimbriæ and pedicle, the appearance of the bladder in the region of the pedicle, the question of singleness or multiplicity, the feel of the base of the bladder per rectum or per vaginam, and, in some cases, the reaction of the tumour to diathermy. The age of the patient is of small importance. The removal of portions of growth through the operating cystoscope is fallacious, as only the surface is removed, and, further, there is a risk of implanting fresh growths.

RELATION OF HISTOLOGY TO RESULTS OF TREATMENT.—Scholl¹ discusses this aspect on the basis of 333 cases at the Mayo Clinic. Complete data were obtained in 252 cases, of which 216 were operable and 36 inoperable. Of 168 epithelial tumours removed at operation, 3 were benign papillomata, 71 malignant papillomata, and 96 solid carcinomata. Of patients with malignant papilloma, 36.6 per cent died on an average eleven months after operation, and 43.4 per cent were alive on an average of three years and three months after operation. Of patients with solid carcinoma, 71.2 per cent died on an average seven and a half months after operation, and 28.8 per cent were alive on an average two years and three months after operation. Squamous-celled carcinomata are extremely malignant, 5 out of 6 patients having died after a very short period of symptoms. Adenocarcinomata are of about the same malignancy as malignant papillomata; of 5 patients, 1 died, 1 had recurrence two years after operation, and 3 were well (2 six months and 1 two years after operation); these tumours have a predilection for the upper areas of the bladder. There were 3 cases of angiomata of the bladder, in patients aged 7, 19, and 76 respectively; one was inoperable, one died of hæmorrhage, and one was alive and well five years after operation. One case of myoma of the bladder was well eight years after operation. Myxomata occur in early life; two infants died soon after operation for this condition. Sarcoma is the

rarest and most malignant of bladder growths; one case observed was inoperable.

Kretschmer⁵ describes three cases of carcinoma of the bladder with bone metastases, and believes that tumours, which on cystoscopic examination are small and apparently suitable for resection, may already have metastatic deposits in bone. He insists on the necessity of careful X-ray examination in all cases of vesical carcinoma before the patient is subjected to operation.

INDICATIONS FOR OPERATIVE OR OTHER TREATMENT.—Cunningham⁶ considers the best method for all benign growths is **Fulguration**. If they are resistant to fulguration, he implants **Radium** by means of a metal block into which two radium needles containing up to 15 mgrm. are screwed; the block is united on a flexible shaft which can be passed through the cystoscope and inserted into the growth. Fulguration is used later. If the growth is malignant, and of suitable size and position, **Resection** with a liberal margin of healthy bladder is performed. Transplantation of the ureter may be required, and radium is implanted along the line of the resection at the time of the operation. If the growth is too extensive to permit of complete resection, suprapubic cystotomy is performed and radium needles are implanted in the growth; a large initial radiation is given, and subsequently radium applications are made through the suprapubic opening and through the rectum. In rare cases the growth is so far destroyed by this method as to permit of the closure of the suprapubic wound. After operative removal, cystoscopy is repeated at intervals, and, if recurrence takes place, radium needles are implanted through the cystoscope and also by the rectum. If recurrence is too extensive for this procedure, suprapubic drainage and radium implantation are carried out.

Barringer⁷ states that growths situated close to the bladder neck, small papillomata, pedunculated papillary carcinomata, and infiltrating sessile growths not more than 2 cm. in diameter, can be treated by the transurethral application of radium through the cystoscope. The value of this is: first, to determine how the tumour reacts to radium; secondly, to stop the bleeding temporarily and so facilitate cystoscopy; and thirdly, to destroy the portion of the tumour which is around the internal meatus. Growths other than the above class he treats by opening the bladder, removing salient portions of the growth by snare, and by a radium tube (0.7 millicurie) implanted in each square centimetre. The bladder is then filled with 60 per cent alcohol for three minutes to destroy tumour cells and prevent implantation. The author regards the results obtained by radium as superior to those following operative measures.

At the Mayo Clinic,⁸ the flat, infiltrating, rapidly recurring type of bladder tumour is exposed to radium before operation in the hope of preventing transplantation during, and early recurrence after, operation. Radium emanation tubes are inserted transurethrally into the substance of the tumour after the removal of tissue for microscopic examination. In the majority of cases, marked reduction in the size of the tumour, with widespread fibrosis, is the result.

G. G. Smith⁹ has found that the implantation of bare radium emanation tubes of low potency, or of radium-bearing needles of 5 mgrm. each, in carcinoma of the bladder will cause complete necrosis of the tumour if the radium carriers are inserted 1 cm. apart. For this method of treatment three types of case are suitable: (1) Small single papillary carcinomata; (2) Sessile carcinomata; (3) The base of large fungating growths after destruction of the tumour by the cautery. It is unwise to cause necrosis of a tumour more than 3 or 4 cm. in diameter, for absorption of toxin from the infected slough may prove fatal. In a number of cases where the growth was regarded as inoperable,

complete disappearance of the growth clinically has followed radium implantation.

Stellwagon¹⁰ recommends fulguration of simple papillomata suitably placed in the bladder, but should there be a reasonable doubt as to the practicability of this method, a radical operation by the suprapubic route, combined with fulguration, cauterization, or radium application, is to be preferred. Some cases apparently suitable for fulguration are later found to be unsuitable for this procedure on account of: (1) Pain, which may be so great as to prevent instrumentation without a general anæsthetic; (2) Irritation from instrumentation may cause severe cystitis and bullous œdema which mask the growth; (3) Fever following instrumentation; (4) Broad sessile base disclosed after destruction of the salient growth. In all cases of doubtful malignancy, the open operation gives better results than transurethral procedures. He prefers the actual electric cautery for the destruction of the growth.

TECHNIQUE.—

1. *Radium*.—For the application of radium to new growths of the male bladder, Neil¹¹ uses a Greenburg cysto-urethroscope and a Kelly 'open air' cystoscope 16 cm. long and 10 mm. in diameter. Air distention is obtained by placing the patient in the exaggerated Trendelenburg position. The radium emanation for surface treatment is contained in a glass bulb 3 mm. in diameter encased in a small brass capsule 1 cm. by 0.5 cm. and 1 mm. thick, which in turn is placed in a second glass capsule 3 cm. by 1 cm. and of the same thickness, screwed to the handle of the applicator.

The points for application (called bare tubes or spicules) contain the emanation in glass capillary tubes 2 mm. long and 0.5 mm. in diameter. These are placed in the end of the hollow needle on the point of the applicator, and after the latter is implanted into the growth the tube containing the radium is pushed out from the needle into the tissues by means of a stilet. For surface treatment 100 mgrm. hours is the maximum dosage for each square centimetre of the diseased area. In using an applicator containing 1000 millicuries, it is therefore necessary to hold the applicator six minutes on each area to obtain the equivalent amount of radiation. In this way a tumour with a surface of 9 square cm. would receive the maximum dosage in fifty-four minutes. The entire treatment is finished in one or two exposures over a period of from two to three days. This amount of surface radiation should not be repeated within six weeks.

For implantation treatment, the small glass emanation points are implanted directly into the growth. The author employs 0.5 millicuries of radium emanation to destroy 8 c.c. of tumour. In this way, with a number of prepared introducing instruments, 10 to 15 of the points can be quickly introduced into all parts of the growth in about five minutes. The points are left permanently embedded in the tissue, giving off their maximum activity by the end of seven days, but continuing slightly active for twenty-eight days. An intensive treatment such as this should not be repeated under two months. A better result can be obtained by using multiple points containing a fraction of a millicurie rather than by implanting fewer stronger points. The points escape with portions of the tumour and are discharged in the urine. This method not infrequently causes considerable tenesmus lasting about two weeks—a result which does not occur when the surface treatment is used alone.

2. *Electrotherapy*.—Corbus¹² considers that in order to destroy malignant tumours with thermic electrocoagulation, the current must be low in voltage and high in ampérage, enough voltage only being used to drive the current through the tissues. This varies in different parts of the body. In the bladder, 1500 ma. are sufficient as a rule.

Kidd³ insists on the distinction, made prominent by Cumberbatch and by French writers, between fulguration or sparking and diathermy. Fulguration is produced when too strong a bipolar high-frequency current is turned on at once. Charring of the surface of the growth results, with an increase in the electrical resistance of the charred mass, so that the deeper part of the growth is unaffected. Diathermy is produced by commencing with a very low current and working up gradually over a period of twenty or thirty seconds until a faint blanching appears in the neighbourhood of the electrode. By this means coagulation necrosis of the pedicle and deeper parts of the growth is produced.

3. *Resection of the Bladder*.—Kidd follows Bentley Squier's description of resection of the bladder wall for growth. Opening the bladder is deferred until the area of bladder wall carrying the growth has been separated from the perivesical tissues, the object being to avoid manipulation of the growth as far as possible, so as to prevent dissemination of small fragments and implantation recurrence. Where resection of the ureter and implantation in the bladder has been necessary, Kidd recommends drainage of the extravescical space through a tube passed through the levator ani and ischio-rectal fossa to the surface alongside the anus.

4. *Cystectomy*.—In discussing total extirpation of the bladder, Federoff¹³ states that he prefers implantation of the ureters into the sigmoid flexure, avoiding kinking or tension. In women the entire urethra is removed. In addition to the median abdominal incision, the author makes a transverse incision severing the insertions of the muscles at the symphysis. In the male he removes the prostate and seminal vesicles and drains through the abdominal wall, and in the female through the vagina. The transperitoneal route is preferred to the intraperitoneal.

RESULTS.—Barringer¹⁴ compares the result of treatment of carcinoma of the bladder by radium with those obtained by operative removal. There were 10 operable cases and 20 inoperable ones all treated by radium. Of the 10 operable cases, 8 remained free from recurrence after radium treatment for periods varying from six months to four years; of the 2 remaining cases, one died two years after radium treatment, and the other died three months after cystotomy. In the second group of 20 inoperable cases, there was absence of recurrence in 17 after periods varying from six months to five years; in 3 cases the growth recurred, in one outside the bladder, in another at the internal meatus, while the third patient died as the result of a radium slough of the bladder.

Of 56 cases treated by Kidd³ by diathermy, 28 were simple papillomata, 2 were inflammatory, and 26 were malignant papillomata. Of the 28 simple papillomata, 21 were traced, and 19 showed no sign of recurrence, varying from four to nine years after treatment; 2 relapsed, and were afterwards operated on without recurrence in twelve months. Of the 26 malignant papillomata, 14 responded to diathermy, and 9 remained cured, the remainder not being traced; 12 resisted diathermy, and of these 7 were operated on, 2 remaining well.

Of 28 cases of partial resection of the bladder, 6 died within a month of the operation. Of the remaining 22, 11 were well after periods of one to eleven years, 6 had recurrences and 5 died of it, 1 died of intercurrent disease, and 4 were lost sight of.

Seventeen cases of papilloma (simple and malignant, single and multiple) were treated by removal from within the bladder, and 2 died; there were 6 recurrences in 4 patients, all of whom died; 4 were not traced; and 5 remained free from recurrence.

There were 5 cases of complete cystectomy, all dying under three weeks from the operation.

Lower¹⁵ has records of 222 cases of bladder growth, of which 108 were malignant. Operations were performed on 81 of these, with a mortality of 9·8 per cent. Excision was employed in 59, or 72·8 per cent. The cautery was used in 10, and combined with operative interference in 8. The ureters were transplanted in 4 cases, in two of which the bladder was removed. Information is given in regard to 61 cases operated on and 12 not operated. Of the operated cases, 41, or 67·2 per cent, have died; in 21, or 51·2 per cent of these, death occurred in less than a year. In the remaining 18, the length of life was unknown in 5, it was two years after operation in 9, between two and three years in 3, and within five years in 1. In the 22 cases still living, the interval since operation is less than one year in 8, between one and two years in 5, between two and three years in 4, five years and nine months in 1, six years in 1, eight years and ten months in 1, ten years in 1, and eleven years in 1. Among the cases of carcinoma there are records of recurrence in 18, the interval between operation and recurrence varying from one month to one and a half years, and one case eight years.

Burnam and Walker¹⁶ record a case of infiltrating growth of the bladder which recurred four years after excision of the entire growth with a liberal margin, and which has apparently been cured by radium applied to the skin of the abdomen. There has been no recurrence after seven years.

G. G. Smith¹⁷ describes a case of cystectomy for a recurrent malignant growth of the bladder. The right ureter was implanted into the ascending colon, three weeks later the left ureter was implanted into the descending colon, and some weeks later the bladder was removed. The patient recovered from the operation and passed urine from the rectum every three or four hours. No note is given of the later progress of this case. Federoff holds that total extirpation of the bladder is the method of choice for advanced cases of carcinoma. In 11 cases of excision of the bladder, no death attributable to the operation occurred.

Schule¹⁸ tabulates the results of 62 cases in which the entire bladder was removed on account of malignant disease. In 4 cases the ultimate result is not known, but 32 of the patients were permanently cured by the operation.

He considers the operation too extensive for a single sitting, 53·5 per cent of the 48 patients treated in this way having died.

REFERENCES.—¹*Arch. f. klin. Chir.* 1922, Sept., 575; ²*Zeits. f. urol. Chir.* 1922, July 31, 171; ³*Lancet*, 1923, i, 523, 582, 636; ⁴*Surg. Gynecol. and Obst.* 1922, Feb., 189; ⁵*Ibid.* 241; ⁶*Boston Med. and Surg. Jour.* 1923, May 24, 816; ⁷*Amer. Jour. Roentgenol.* 1922, ix, 757; ⁸*Jour. Amer. Med. Assoc.* 1922, Sept. 30, 1178; ⁹*Jour. of Urol.* 1923, March, 217; ¹⁰*Therap. Gazette*, 1922, Feb., 77; ¹¹*Jour. Amer. Med. Assoc.* 1922, Dec. 16, 2061; ¹²*Jour. of Urol.* 1923, March, 203; ¹³*Surg. Gynecol. and Obst.* 1922, Jan., 65 (abstr.); ¹⁴*Jour. Amer. Med. Assoc.* 1922, Oct. 23, 1504; ¹⁵*Ann. of Surg.* 1922, Sept., 352; ¹⁶*Jour. Amer. Med. Assoc.* 1922, June 9, 1669; ¹⁷*Boston Med. and Surg. Jour.* 1922, July 20, 97; ¹⁸*Zeits. f. urol. Chir.* 1923, xvii, 65.

BLEPHARITIS. (See EYE AFFECTIONS, GENERAL.)

BLOOD STAINS DETECTED BY THE MICROSPECTROSCOPE. (See MEDICO-LEGAL POINTS.)

BLOOD-VESSELS, DISEASES OF. (See ANEURYSMS; AORTITIS; ARTERIAL PRESSURE IN OLD AGE; ARTERIOSCLEROSIS, INFANTILE; CAPILLARY PRESSURE; THROMBO-ANGITIS OBLITERANS.)

BONES AND JOINTS, SURGERY OF. (*See also FRACTURES; KNEE-JOINT, INTERNAL DERANGEMENT OF; HIP, CONGENITAL DISLOCATION OF; POTT'S DISEASE.*) *E. W. Hey Groves, M.S., F.R.C.S.*

PAINFUL BACK.

Conn,¹ in introducing this subject for discussion, illustrates his remarks by the consideration of 156 cases of painful back in workmen who claim injury as a cause of their disability. He is impressed with the idea that very few of these cases are malingerers, but on the other hand many are sufferers from non-traumatic lesions, e.g., lumbago, which they honestly ascribe to their work. He divides his cases into three categories: (1) Traumatic, of which there were 87; of these, 65 were some form of strain or sprain. (2) Potential, i.e., when pre-existing postural weakness made a slight injury cause lasting pain; of these there were 29. (3) Non-traumatic. These, of which the majority were myositis or arthritis, numbered 40. It is instructive to note that in this large series of cases there were only three which showed definite injury or disease of the vertebral bodies, viz., two cases of compression fracture and one case of dorsal Pott's disease. In 92 per cent of all cases the pain complained of was below the 12th dorsal spine. For practical purposes of diagnosis and prognosis attention must be concentrated on four points, viz.: (1) The existence of extrinsic disease, e.g., in the abdomen or pelvis, which may account for the pain; (2) The discovery of any abnormality of the bones or joints of the spine or sacro-iliac articulations; (3) The existence of true muscle spasm; (4) The determination of whether the pain or spasm is unilateral or bilateral. Probably in many of these troublesome cases it would be well worth while to admit the patient to hospital for a week or two's observation and examination. This would often serve to cure the minor cases, and to settle the diagnosis in those of a more obstinate nature.

Straub² also discusses this subject under the more general heading of "Conditions causing Backache." He lays stress upon the extrinsic causes, e.g., disease of the genito-urinary organs, visceroptosis, and nervous diseases. In regard to the intrinsic causes, he points out that abnormalities of the lower spine and sacrum occur in nearly 15 per cent of all subjects. It is most difficult to say whether the so-called sacralization of the 5th lumbar vertebra is the cause of definite symptoms. In this condition the transverse processes of the last lumbar vertebra are larger than normal, and articulate either with the sacrum or with the crests of the ilia. It is not at all certain, however, that such an abnormality is the real cause of pain, which may be due to laxity of the sacro-iliac joints in the first place; such laxity allowing the body-weight to bring undue pressure upon the abnormal lumbar vertebra processes.

ACUTE SYNOVITIS AND ARTHRITIS.

The treatment of acute arthritis, whether serous or suppurative, has so long been one of splinting and rest that it will take long for this idea to be abandoned. Willems, before and during the war, demonstrated, however, that **Early Evacuation of Effusion or Suppuration, followed by Immediate Active Movements of the Joint**, gave a much more rapid and complete recovery of function than could be obtained by any splinting. It is, however, essential to understand that this treatment must be carried out in an early stage of the infection—that is, before any destruction of the cartilage or bone has taken place. The explanation of the efficiency of Willems' method consists in the fact that, when once drainage has been provided, active movement of the joint will serve two objects: first to free the joint mechanically of the

contained effusion, and second to prevent adhesions of inflamed surfaces or atrophy of the muscles. MacWilliams³ urges that these principles, the value of which was so amply demonstrated during the war, should be extended to the treatment of acute traumatic synovitis resulting from accidents of civil life. He summarizes his conclusions as follows: Repeated aspirations combined with active movement and walking without splints is the best method of treating both acute and chronic synovitis, provided there is no loose body present; aspiration should be immediately performed in all types of traumatic joint effusions; all other physio-therapeutical measures are unnecessary, and therefore recovery is much quicker and simpler. He considers that the time taken for recovery by this method is less than one-half of that needed by splinting and massage.

Many German surgeons, following the lead of Payr,⁴ whilst admitting the principles of small early incisions and early movements, nevertheless attach great importance to the use of a Mixture of Carbolic Acid and Camphor injected into the joint, both as a prophylactic and as a curative method of treatment. The formula originally introduced by Chlumsky is as follows: Acid carbol. liq. 30; Camphor. tritæ 60; Alcohol abs. 10. Hedri⁵ summarizes Payr's principle of treatment of acute infected arthritis as follows: Small incisions when possible, and drainage at the deepest point; filling the joint capsule with phenol-camphor solution; closure of the capsule; early movements. It is claimed that the mixture of camphor and carbolic acid produces no toxic symptoms and does not injure the cartilage of the joint. This is borne out by a series of animal experiments, and also by clinical evidence.

THE FIXATION OF TUBERCULOUS JOINTS.

Although the general tendency to conservative and non-operative treatment for tuberculous joints is gaining ground every year, yet there are still many attempts made to simplify and shorten the methods of fixation necessary for a natural cure. The fixation of the tuberculous spine by means of a bone-graft is a good example of this type of operation.

Sacro-iliac Joint.—Certain joints, e.g., the sacro-iliac, are very difficult to fix by external splinting, and such joints afford good opportunity for fixation operations. Thus, Tuffier⁶ has in five cases treated sacro-iliac disease by the insertion of pegs fashioned out of the patient's own tibia. Such an operative method has various advantages, the chief of which is that it does not require a large exposure of the diseased area, nor involve the risk of dissemination by cutting or scraping the tuberculous focus. Two bone-pegs are cut from the antero-internal surface of the tibia, about three inches long, and these are driven transversely through the wing of the ilium into the body of the sacrum as far as possible from the seat of active disease as determined by X rays. Tuffier has used the same method in dealing with tuberculosis of the ankle and knee, but in both these situations the alternative radical methods are much more simple and satisfactory than in the sacro-iliac joint. It is the danger and difficulty of radical treatment of a diseased sacro-iliac joint that makes some less direct attack so desirable.

Nuttall,⁷ however, commends the radical operation devised by Picqué, and describes the good results he has obtained from it. In this method the posterior portion of the ilium is resected after turning down a flap of skin and muscle. In this way the lateral mass of the sacrum is exposed and can be everted, whilst any anterior extension of the abscess can be dealt with. He has collected 9 cases, chiefly from Thelwall Thomas's clinic. These show well the kind of results obtained from different methods of treatment. One

case had no abscess, and recovered with no treatment but rest. All the others had abscesses, and in none of these was a cure recorded except in two cases where the radical operation was done. In other words, the operation of opening and curetting an abscess due to sacro-iliac disease is one which gives almost no prospect of success.

Shoulder.—An ingenious indirect method of operating upon a tuberculous shoulder is described by Baron.⁸ It is intended for those chronic cases of disease where ankylosis without much suppuration or destruction takes place. According to the usually accepted conservative methods in such a case, the arm would be gradually brought up to the full abduction and then fixed, so that eventually scapular movement would be substituted for shoulder movement. But not only does this involve very lengthy fixation in an awkward position, but it implies stress and strain on the area of recently diseased tissue when the splint is left off. The new operation is designed to avoid both these objections. The humerus is divided just below the surgical neck and strongly

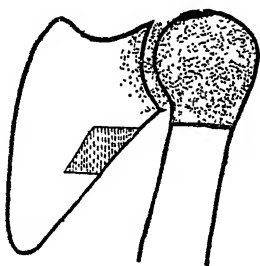


Fig. 15.—Ankylosed shoulder resulting from tuberculosis.

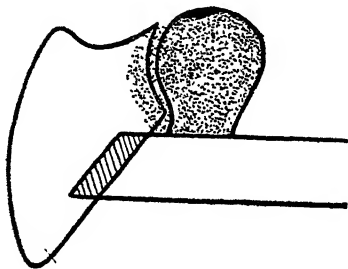


Fig. 16.—Abduction of humerus and fixation of shaft to scapula after division below surgical neck.

(Redrawn from the 'Zentralblatt für Chirurgie'.)

abducted, so that the shaft of the bone comes to lie against the axillary border of the scapula, which is specially refreshed for its reception (Figs. 15, 16); the actually diseased joint is not touched. Ankylosis soon occurs in the abducted position, and there is then no strain upon the tuberculous focus.

THE SURGERY OF PARALYSIS.

Paralysis of the Glutei Muscles in Poliomyelitis.—It has always been recognized that this paralysis is very difficult to cure or correct. The gluteus maximus is necessary for standing in the erect position, the gluteus medius for tilting the pelvis up when the opposite leg is lifted off the ground. When this abduction action is lost, the pelvis, instead of being raised with each step on the side of the swinging leg, droops, and a serious unsightly limp results. Legg⁹ makes a valuable suggestion which may in suitable cases meet this difficulty. It is to transplant the tensor fasciæ femoris to the outer side of the leg so that it shall act as an abductor instead of a flexor. Its tendon is divided just as it joins the fascia lata, and brought back and fixed to the outer surface of the great trochanter (Figs. 17, 18). Legg states that he has now done this in fifteen cases and is well satisfied with the result.

Spastic Paralysis.—Many methods of treatment of spastic paralysis have been advocated from time to time, and experience of each has now been sufficient to compare the results obtained. Broadly speaking, there are four types

of operation possible for spastic paralysis due to a cerebral lesion. These are :—

1. A decompression operation on the head. This is very rarely justified, because the lesion is an old one, and no direct attack will cure the resulting degeneration of the spinal-cord tracts.

2. Division of the posterior nerve-roots of the segments corresponding to the spasm. This aims at lessening the spinal reflex which, uncontrolled by the brain, is responsible for the spasm. The method is difficult and dangerous, and its results are very uncertain.

3. Division of some of the motor nerves which supply the spastic muscles. This is **Stoffel's Operation**, first described in 1910. Stoffel showed that each main nerve had a definite arrangement of nerve bundles which was constant,

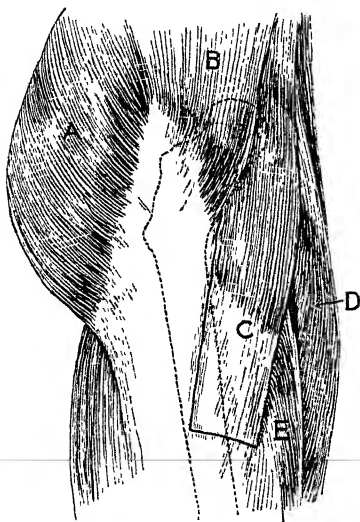


Fig. 17.—Normal anatomical appearance about the hip. The black line along the tensor fasciae femoris represents the incision made in freeing the muscle before transplantation. A, Gluteus maximus; B, Gluteus medius; C, Tensor fasciae femoris; D, Rectus femoris; E, Vastus lateralis.

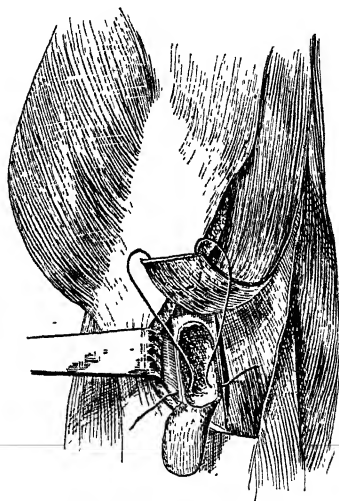


Fig. 18.—Groove in femur, and freed tensor fasciae femoris with silk suture before insertion into femur.

(Figs. 17 and 18 redrawn from the 'Journal of the American Medical Association'.)

and that on exposure of such a nerve a knowledge of such topography, together with the aid of electrical stimulation of its separate bundles, would enable a selection to be made of those motor nerves which it is desirable to put out of action. This method is free from risk, and has given very good results in the hands of those who have patiently followed up the after-care of their cases. Thus, Heyman¹⁰ has recently recorded twenty-four cases treated by Stoffel's method with a large degree of success. The main muscle groups he has dealt with were the pronator radii teres and hand flexors, by partial division of the median nerve (Figs. 19, 20); the adductors of the thigh, by division of the anterior branch of the obturator nerve (Fig. 21); the hamstrings, by division of parts of the sciatic nerve; the calf muscles, by partial division of the internal popliteal nerve (Figs. 21, 22).

4. Lastly, of course, there is the simple method of tenotomy or tendon

transplantation. This is only of very limited application, and the results are liable to speedy relapse. It is often useful to divide a tendon, e.g., the tendo

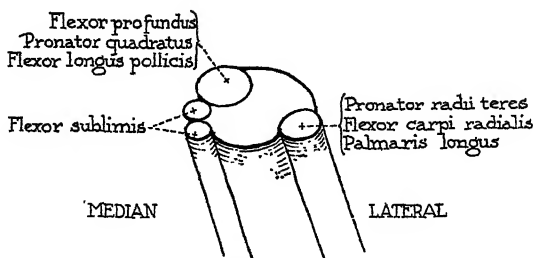


Fig. 19.—Topography of the cross-section of the median nerve. Diagrammatic.

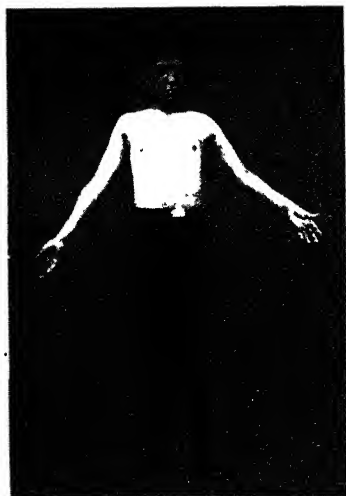


Fig. 20.—Result after operation on the median nerve for contracture of the forearm, wrist, and fingers.

Figs. 19-22 kindly lent by
'Surgery, Gynecology, and Obstetrics'.

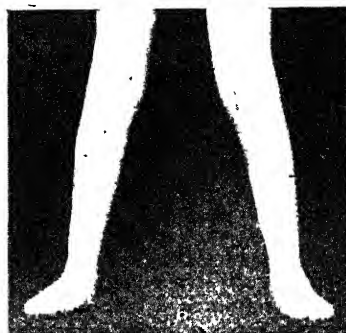


Fig. 21.—Result after operation on the obturators and internal popliteals.

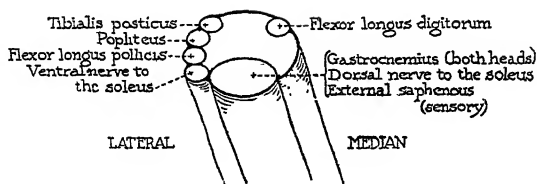


Fig. 22.—Topography of the cross-section of the internal popliteal nerve. Diagrammatic.

Achilles or the thigh adductors, in order to get the limb into a position in which walking can be begun, but this usually implies that some retentive or corrective appliance must be worn for a very long time to prevent a relapse.

BONE ABSCESS AND BONE CAVITIES.

It is usually considered that a chronic bone abscess will always necessitate a wide removal of one of its walls so that healing may take place. Brickner¹¹ challenges this statement. He says that such a chronic bone abscess is usually the residue of an old osteomyelitis, and that it has become sterile. Therefore all that is necessary to do is to evacuate the pus through a small drill-hole, when healing will take place. The bone is exposed over the site of the abscess, and drilled by a $\frac{1}{4}$ -in. drill until the cavity is reached and the pus escapes. A culture is taken from this to determine the nature and virulence of the infection. If an immediate smear shows few or no organisms, then nothing more is done beyond leaving a rubber drain in the soft tissues, down to but not into the bone.

The closure of large infected bone cavities has always been a problem of great difficulty. Reid¹² makes the suggestion that when the bone is superficial (as in the tibia) it should be laid open, and when covered by firm granulations its surface should be grafted by multiple Reverdin grafts. The bone cavity is treated with Dakin's solution until it becomes lined with clean firm granulations. The surface is then covered by a number of 'pinch' grafts about half a centimetre each in diameter, and placed as close together as possible. The grafted surface is left exposed to the air for six hours, then covered by a single layer of gauze over which saline compresses are applied. Later, if the granulations sprout up too much between the grafts, Dakin's solution is used instead of saline. In about ten days to two weeks the whole surface is covered with a new epithelial covering (*Plate X*).

CONGENITAL CLUB-FOOT.

It is a little difficult to reconcile the confident assertion of orthopædic surgeons that club-foot in infancy can easily be cured by simple manipulation, with the many new and varied expedients suggested for supplementing the simple method. Bankart¹³ describes such a supplementary method. He first corrects the deformity by wrenching and tenotomies, followed by plaster or a tin shoe. Then after a few weeks, in order to maintain the corrected position without having recourse to instruments, the operation is done. This consists in passing a stout, specially prepared silk ligature through the base of the 5th metatarsal bone, carrying the same up under the skin on the outer side of the leg, and fixing it to the tibia, by a hole drilled through that bone. The silk acts as a new ligament to hold the foot in the corrected position, and even if this silk has to be removed on account of irritation or sinus formation, there will have formed round it a tract of fibrous tissue which will continue to function as a check ligament.

REFERENCES.—¹*Jour. Amer. Med. Assoc.* 1922, Oct. 7, 1210; ²*Ibid.* 1923, March 10, 674; ³*Ann. of Surg.* 1922, Dec., 677; ⁴*Zentralb. f. Chir.* 1922, No. 28, 1018; ⁵*Arch. f. klin. Chir.* 1922, Dec., 281; ⁶*Bull. et Mém. Soc. de Chir. de Paris*, 1922, 927; ⁷*Lancet*, 1923, i, 839; ⁸*Zentralb. f. Chir.* 1923, March 24, 477; ⁹*Jour. Amer. Med. Assoc.* 1923, Jan. 27, 242; ¹⁰*Surg. Gynecol. and Obst.* 1923, June, 613; ¹¹*Ibid.* 1922, July, 84; ¹²*Johns Hop. Hosp. Bull.* 1922, Nov., 386; ¹³*Brit. Med. Jour.* 1922, ii, 1115.

BRAIN, TUMOURS OF.

J. Ramsay Hunt, M.D.

A Method for the Localization of Brain Tumours in Comatose Patients.—This method is described by Walter E. Dandy.¹ It involves the determination of communication between the cerebral ventricles and the estimation of their position and size without the injection of air (ventricular estimation). The method proposed is to estimate the size, position, and intercommunication of the ventricles by aspiration of the fluid in the lateral ventricles (and at times from

PLATE X.

TREATMENT OF BONE CAVITIES



Fig. A.—Several months after epithelialization of the bone cavity. The extent of the cavity into the ends of the tibia is not shown in the photograph. The gratts can be seen.

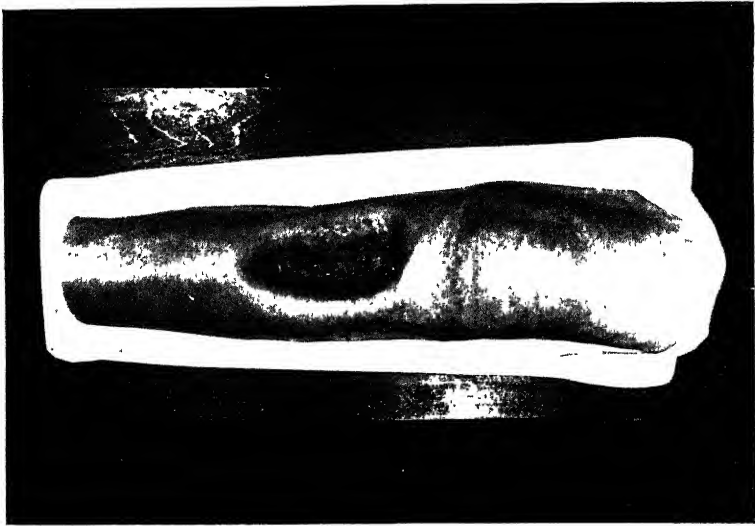


Fig. B.—Bone cavity three weeks after grafting it with large punch grafts.

Kindly lent by the 'Johns Hopkins Hospital Bulletin'

the *cisterna magna*). We have learned from necropsy material, but particularly from ventriculography, that practically all brain tumours which cause intracranial pressure alter the size, shape, or position of part or all of the cerebral ventricular system; and the situation of brain tumours is therefore determined by the deviations in the size, shape, and position of the ventricles.

The position of the lateral ventricles can be determined by ventricular punctures; their size by measuring the fluid in the ventricles; and their communication with each other by injecting a dye into one ventricle and testing for the colour elsewhere in the ventricular system (*Figs. 23, 24, 25*). This information, while it leaves much still to be desired, is usually at least sufficient to tell whether either cerebral hemisphere or the cerebellum is the likely seat of the tumour.

Since the introduction of cerebral pneumography, it has been our custom to make a small perforator opening in the occipital region of *both* sides of the skull. Frequently one ventricle is collapsed or displaced by a tumour and cannot be reached by ventricular puncture, but it

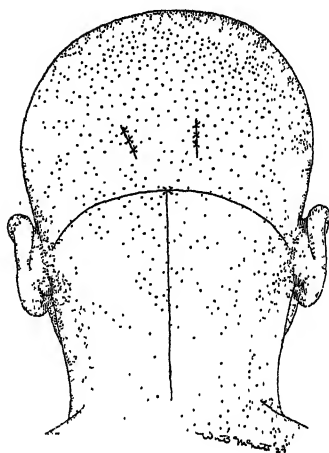


Fig. 23.—To show the position for bilateral ventricular punctures. A cerebellar incision is outlined for orientation. For the puncture, either a slight oblique or vertical incision can be made. (*Figs. 23, 24, 25 are redrawn from 'Surgery, Gynecology, and Obstetrics'.*)

will be exceptional for both ventricles to be inaccessible. Usually the puncture of only one ventricle is

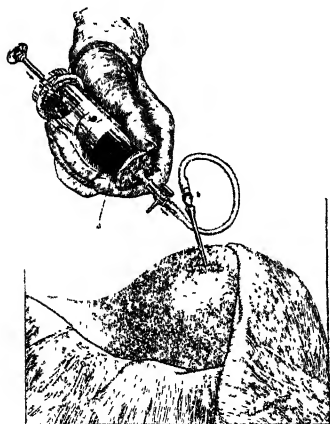


Fig. 24.—To show method of ventricular puncture and aspiration of the ventricle and injection of indigo carmine (a).

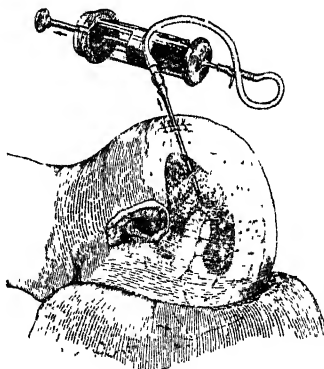


Fig. 25.—Diagram, with lateral ventricles outlined, indicating the approximate course of the ventricular needle.

necessary for cerebral pneumography, but since we cannot foretell which ventricle can or cannot be reached, and since at times both ventricles must be

tapped, it is better to have both ventricles under control. The two openings can be made as easily and safely as one. The occipital region is chosen because the largest part of the lateral ventricle, the vestibule, is most accessible from this point. Moreover, the vestibule of the ventricle is, on the whole, less easily collapsed and dislocated than other parts of the ventricle. At times we have used bilateral punctures of the anterior horns of the ventricles, but here the ventricles are smaller, and consequently harder to enter. Moreover, dislocation and collapse of both anterior horns is more likely, because they are closer together, and therefore more equally affected by any pressure directed from the side. The vestibules and posterior horns are farther apart, and are less equally occluded by the same pressure. Another anatomical factor which carries weight is that the anterior puncture must be nearer the mid-line, and consequently through a field of larger veins which are nearing the longitudinal sinus. These may easily be punctured, whereas the posterior puncture is through a less vascular area. The lateral puncture into the descending horn has been used very sparingly, and practically never bilaterally. At times a patient has previously had a decompression performed, and an attempt may be made to enter the ventricle under these circumstances. A lateral puncture of the left side would hardly be considered, because of the important speech areas which the needle must traverse. For ventricular estimations we have used the same posterior approach to the ventricles. *Punctures of both ventricles are then always necessary.*

It is well to reiterate that there are great possibilities of error in this procedure, for reasons which the author shows. It is justifiable to disregard these possible mistakes only when the patient's condition is so serious as to preclude cerebral pneumography, or when there is only a slight element of doubt as to the location of the tumour which may be eliminated in this way. The whole procedure, of course, is dependent upon knowledge of ventricular topography, upon the confidence in one's ability precisely to reach the normal ventricle, and in the interpretation in terms of intracranial pathology of the results of the punctures. The first element of uncertainty lies in the great variation in size of the normal lateral ventricles.

The method is relatively simple, easily performed, relatively harmless, and requires very little time. The principal danger to life is in puncturing an intraventricular tumour and thereby causing death from intraventricular hæmorrhage. Though this is always an actual danger, it is not deterrent when we consider the magnitude of the problem of saving an unconscious patient. It requires very little, and at times no extra, time, but the relief of intracranial pressure by release of fluid is more than compensatory. The greatest drawback is the possibility of an incorrect localization. Were it not for this very great element of error (described above), the procedure could be used as a substitute for cerebral pneumography. But the element of error is of such magnitude that the procedure should be used only in emergencies, where the more precise methods would add danger to an already overstrained intracranial tension.

Cranial and Intracranial Endotheliomata: Hemicraniosis.—Wilder G. Penfield² describes this group of dural endotheliomata. They give evidence of their presence and position by a typical, slowly growing, hard prominence on the cranium. Their nature has not been generally understood. They have been called hemicranioses by some authors, in the belief that they were hypertrophies invariably situated in the cutaneous distribution of the first division of the trigeminal nerve. The cranial boss has been frequently considered to be a simple exostosis. The microscopic picture of these tumours is that of endothelioma of the dura, their nuclei being frequently arranged in whorls or palisades. They appear to arise from the arachnoidea, displacing without

infiltrating the brain. They pass through the dura in a number of places, enter the overlying bone, and cause a complete rearrangement of the osseous structure. The bone-forming elements produce bone in the substance of the neoplasm. This osteogenic activity is greatest in a pad of endothelioma which lies between the skull and scalp, with the result that an osseous tumour forms on the external surface of the cranium. The temporal muscle and scalp may be infiltrated with the neoplasm.

The author studied 420 histories of cases in which the diagnosis of brain tumour had been proved at operation or autopsy, and, of these tumours, 11 were found to be associated with a lump on the cranial vault. In one of these 11 cases the lump was soft and could be pressed inward through the skull. This proved to be a sarcoma, and could not have been confused clinically with the remaining 10 cases, in all of which the lump was quite evidently a bony prominence of the skull. All of these 10 cases presented the same pathological picture and similar clinical histories.

Operative removal, in cases where the patients survived the immediate effects, has resulted in cures. In most instances it should be possible to make the diagnosis before the onset of distressing cerebral symptoms. The characteristic cranial prominence, increasing over a considerable period, associated with pain of a stabbing character beneath the tumour, is pathognomonic of the condition.

Whatever may be the etiology, the cranial prominence is secondary to invasion of the skull by the intracranial tumour. It is incorrect to suppose that the cranial and intracranial tumours are of entirely different nature. They are the same, except that the growth of the former is accompanied by bone formation. It is evident, therefore, that the following hypotheses are incorrect: (1) That a primary thickening of the skull irritates the dura and thus causes the appearance of an intracranial endothelioma; (2) That some irritation causes the dura to lay down neoplasm on one side and exostosis on the other. It is usually impossible to elicit a history of trauma, and yet the much greater incidence of this type of endothelioma among men than women suggests that trauma may be in some way an etiological factor.

Brain Tumours in Young Children.—A clinical and pathological study of brain tumours in young children has been undertaken by Bartlett and Wollstein.³ In 4363 autopsies performed at the Babies' Hospital in New York, a neoplasm of the brain was found in only 9, an incidence of 0.2 per cent; the occurrence of brain tumours in adults is 1 per cent. Of the children with such growths, 2 were girls and 7 were boys. Their ages ranged from two weeks to three years.

In the detailed study of 7 cases, it was found that 5 of the neoplasms were located in the cerebellum, and 2 were in the cerebrum, constituting supratentorial tumours. All of the infratentorial tumours involved the vermis, extended into one lobe of the cerebellum, compressed the other lobe, and had distorted the medulla. One had extended into the pons and was accompanied by a cyst of the fourth ventricle. Another involved one of the cerebellopontine pedicles. None had formed metastases in other organs. The tumours were all large. They were situated under the pia, which was deep-red or reddish-blue over the growth, and were very vascular. They contained small hæmorrhages and areas of necrosis. Hydrocephalus was present in every case. Histologically all five infratentorial tumours were gliomata of the astrocytoma type. The two supratentorial tumours were dissimilar in location and structure. One involved the corpora striata, optic thalami, and corpora quadrigemina; histologically this growth was a glioma. In the other case the tumour occurred in a child so young (the first symptoms being noted at two weeks of age) that

its congenital nature could not be doubted; histologically this tumour was a glioma sarcomatosum or gliosarcoma. One boy with a glioma had a horseshoe kidney.

The symptoms produced by the growths were similar to those in adults—viz., spasticity, increased reflexes, and focal paralysis. Vomiting occurred in three of the seven cases as an early symptom, but in none was it unusual in frequency or of the explosive type. Convulsions occurred in only one instance, and then only a few hours before death. Infrequency of vomiting and convulsions in infants may be explained possibly by the fact that the intracranial pressure increases gradually, and young brain tissue is extremely adaptable to gradual pressure.

The spinal fluid was increased only in the early cases. In one case it was yellow. An increased cell-count was found in only one instance, and the globulin was increased only in the case with the yellow fluid. In the latter the fluid showed a bloody tinge at autopsy which was ascribed to the marked hæmorrhage and necrosis in the tumour.

REFERENCES.—¹*Surg. Gynecol. and Obst.* 1923, June, 641; ²*Ibid.* 657; ³*Ibid.* 1922, Oct., 271.

BREAST, SURGERY OF.

Sir W. I. de C. Wheeler, F.R.C.S.I.

Lee¹ gives a report of 83 cases of *inoperable carcinoma of the breast treated by radiation*. He refers particularly to primary inoperable carcinoma. A primary inoperable breast carcinoma is one in which one or more of the following factors are present: (a) Fixation of the breast tumour itself to the chest wall; (b) Involvement of the supraclavicular nodes; (c) Definite involvement of the opposite axillary nodes; (d) Diffuse subcutaneous nodules; (e) Diffuse inflammatory carcinoma involving a considerable skin area; (f) Chest metastases—pleural or mediastinal; (g) More remote metastases.

What can radiation do for the primary inoperable carcinoma of the breast?

1. Check considerably the rate of growth of the carcinoma, frequently causing a considerable regression and at times a disappearance of the carcinoma. The persistence of a mass in the breast may not necessarily indicate that active carcinoma is still present. Fibrous tissue replacement may leave a definite hard tumour mass, which may be misleading in estimating the exact effect of radiation upon the tumour itself.

2. Involved nodes in the axillary or supraclavicular regions may be expected to regress considerably, and in some instances they have entirely disappeared under treatment by radiation.

3. A fixed breast tumour may be rendered mobile, permitting a palliative operation with removal of the breast itself, eliminating the possibility of subsequent ulceration. Four cases did particularly well that received this type of treatment.

4. Relieve in some measure the patient's discomfort and pain. The effect upon spinal metastases has been variable, but in a few instances there has been marked relief of pain over a considerable period.

One is compelled to admit that certain cases are altogether too advanced to hope for any good result by any means of treatment. Too much emphasis cannot be placed upon the unwisdom of promising patients with advanced disease remarkable results from radiation or any other form of treatment. Such cases, however, are often given mild X-ray radiation for the moral effect, but the family are told what we believe to be the truth concerning the case.

The late J. B. Murphy was accustomed to teach that cancer of the breast followed injury, but that a history of injury in cancer elsewhere was quite uncommon. Lee finds that 28.9 per cent of his cases had a fairly definite

history of trauma. He thinks that a weight record is a very fair index to a patient's state of health, but has observed many instances of advance of the malignant process with no loss of weight.

When the growth is one of considerable size, reliance is usually placed upon **X-ray Radiation**. The type of case best suited to radiation by means of **Radium** are small breast tumours involving the axillary and supraclavicular glands, and tumours involving the sternum and chest wall to a moderate degree. The details of the X-ray and radium treatment are given in full. He concludes an interesting paper as follows: (1) Primary inoperable carcinoma of the breast has shown good results by radiation. (2) The patient must be kept under constant clinical observation. (3) The type of radiation must be properly selected for each individual case. No routine prescription will suffice. (4) Over-treatment by radiation must be avoided. (5) Very advanced cases are unsuitable for any form of treatment. (6) The palliative operation following properly planned radiation is of service in well-selected cases. (7) A co-operating Social Service Department makes a follow-up system effective and gives humanitarian relief to the hopeless cases. (8) The results to date are very gratifying and encouraging. As the disease itself and the technique of radiation become better understood, we believe that more and more satisfactory results will follow, and that the possibility of still further control of the disease by radiation may ultimately be realized.

Pfahler² states that if the disease is confined to the breast without glandular involvement, four out of five patients operated on will live and be free from the disease at the end of five years; but if the disease has spread from the breast to the axilla or anywhere else, no more than one out of five can be cured. He further states that: (1) It has been shown that thorough radiation treatment of cancer tissue will devitalize the cancer cells so as to interfere with their inoculation or further development. This justifies our recommendation of ante-operative treatment. (2) It has been shown that radiation effects are most evident on new growing tumour, and such radiation will prevent the growth of inoculated tumours. Therefore we recommend active post-operative treatment in cancer of the breast. (3) Visible and palpable recurrent metastatic cancer are probably only an index of similar disease elsewhere, and therefore the treatment of these cases should not be confined simply to the palpable and visible disease. Such visible and palpable disease should receive the most active treatment and sufficient to cause its destruction and disappearance. (4) Thorough radiation treatment will cause the disappearance of tumour tissue in some cases, and therefore can be recommended when there is any reason for avoiding an operation. (5) In every case of cancer of the breast there should be an X-ray examination of the chest, and this should be repeated from time to time to detect any possible invasion of the mediastinum, lungs, sternum, or spine.

Gage and Adams³ discuss the *end-results of operations for cancer of the breast*, and reach the following conclusions: (1) No time limit can be set beyond which recurrence may not occur. (2) Absence of malignant infiltration of axillary glands warrants much more favourable prognosis. (3) Any lump in the breast is to be regarded with suspicion and carefully watched. (4) Its persistence, and especially its activity, as indicated by increase in size, is ground for its removal, though not necessarily involving removal of an entire breast. (5) A continued discharge from the nipple means pathology in the breast, must be kept under close observation, and be regarded with suspicion.

Bulitz,⁴ dealing with the same subject, says: (1) The successful treatment of cancer of the breast as of any other pathological condition should be strictly individualized; (2) The ultimate sequelæ depend more upon the stage and

dissemination of the growth when it is presented for treatment than upon any defined method of operation ; (3) Greatly increased data regarding the value of the pre- and post-operative use of X rays and of radium are required before final conclusions can be drawn, although there seems little doubt of the value of radium applied directly in the axilla ; (4) The substitution of X rays or of radium for surgical treatment cannot safely be considered at the present time ; (5) The early removal of any growth remains the one and only sure method of treatment.

Bloodgood,⁵ who is a great authority on the subject of breast tumours, writes on the *clinical diagnosis*, and refers to the National Campaign of Education on Cancer carried on in America. The diagnosis of cancer can be excluded, he thinks, in patients of 25 years of age and younger. The presence or absence of pain is of no value as a differential diagnosis. It is the experience of most surgeons that pain is more often absent than present in malignant growths, unless the malignancy is produced in some mechanical obstruction or complication. Most surgeons become alert when a patient gives a history of discharge from the nipple ; but Bloodgood believes that the history of a discharge from the nipple, no matter what its character, does not indicate a cancerous lesion unless a definite lump is found at examination, or unless ulceration suggests Paget's disease. Now and again retraction of the nipple may be associated with chronic cystic mastitis. Any irritated condition of the nipple which does not heal quickly after cleansing and protection should be looked upon as Paget's disease, and treated by at least a complete excision of the breast.

He refers to indefinite tumours, single or multiple, in one or both breasts, as the 'lumpy' breast, and produces evidence to show that these cases are not more likely to become carcinomatous than any others. The literature on the so-called chronic mastitis has exaggerated its relation to cancer, and this authority thinks that pain, discharge from the nipple, and the palpation of one or more indefinite areas in one or both breasts, is not necessarily indicative of cancer. He describes a soft, compressible, worm-like tumour beneath the nipple due to dilatation of the ducts, with a slight blood-free discharge, which can be easily distinguished from cancer, beginning in the nipple zone. The latter is quickly associated with retraction or fixation of the nipple.

Sistrunk⁶ has studied the histories of 246 patients operated upon for cancer of the breast at the Mayo Clinic. The recurrences were mostly in the late cases, evidently because cancerous tissue was left in regions inaccessible to the knife. The highest percentage of cures, and the infrequent recurrences, were found in cases in which operation was performed early in the course of the disease, before glandular involvement could be demonstrated.

In the series studied, local recurrences are known to have occurred in only 10.5 per cent of the patients in whom no glandular involvement could be demonstrated at the time of operation. In the 46 cases with local recurrences the glands were involved at the time of operation in 80.4 per cent. Of 86 patients operated on before the glands were involved, 64 per cent are alive from five to eight years after the operation, and there are known recurrences in only 6. Of 132 patients in whom the glands were found to be involved at the time of operation, 19 per cent are alive from five to eight years after the operation. The highest percentage of deaths occurred among the youngest and oldest patients. The chance for cure seems definitely higher in patients over 50 years of age.

One hundred and four (73.3 per cent) of the 132 patients died from recurrences ; 6 of the 218 patients died within six months after operation. By

the end of the first year 46 were dead; by the end of three years, 92; by the end of four years, 107; and by the end of five years, 120.

At the end of five years 29 of the 132 patients in whom glandular involvement was demonstrated at the time of operation were alive, and 56 of the 86 patients in whom the glands were not involved at the time of operation were alive. Regardless of glandular involvement, 85 of the 218 patients were alive at the end of five years.

Haggard and Douglas,⁷ from a study of 255 cases of tumour of the breast, come to the following conclusions: (1) No malignant tumour of the breast occurred in a woman under 27; (2) The average age of patients with cancer of the breast was 49.2 years; (3) In cases of recurrent carcinoma, the patients were five years younger than in the primary cases; (4) All sarcomas occurred in males, and constituted 2.3 per cent of the malignant cases; (5) In only one-third of the malignant cases was there a family history of cancer; (6) In two-thirds of the cases in which the lesions were benign, the patients gave a positive family history for cancer, which probably caused them to apply for examination even though their lesions were benign; (7) The average duration of cancer before operation was 26½ months; (8) One case in five was inoperable; (9) Patients with benign lesions had an average age of 36.1 years, which was thirteen years younger than in the malignant cases; (10) The average duration was 14 months, as against 26½ months for carcinoma cases; (11) From five- to ten-year cures in 111 traced cases of operations for cancer of the breast occurred in 45.7 per cent; (12) The preventable surgical mortality was 0.8 per cent.

With regard to the all-important question of *prognosis in cancer of the breast*, it depends upon the surgical removal, which must follow on the lines of Halsted's operations; it depends also upon the variety of the cancer. Much fibrous tissue denotes a successful struggle against cancer cells. The soft medullary tumours suggest rapid progress, early dissemination, and early cachexia. Rare forms of cancer, such as colloid cancer, sometimes become encapsulated and grow to huge dimensions without invading the axilla. Some patients have a well-established immunity against cancer. The lymphoid tissue and lymphatic element of the blood are part of the body defence. The prognosis depends also largely on the duration of the disease before operation. If a tumour has grown to a certain size in two months, after two more months have elapsed the probability of a cure is not one-half, but one-fourth. Reference has already been made to the fact that perhaps 80 per cent of patients can be cured if the axillary or other glands have not been infected, but these figures are reduced to about 25 per cent when there is glandular involvement. Saltzstein⁸ draws attention to these points, and concludes as follows: (1) Radical different methods of surgical removal of breast cancers are not to be expected. Improved operative procedures will play little rôle in increasing the percentage of cures. (2) The clinical variety of the tumour, or the variety divided by the patient's immunity, is of profound importance in determining the prognosis. (3) Operations upon recurrent carcinoma of the breast are distinctly indicated in certain cases, when the type is favourable. If the type is not favourable, operation hastens death. (4) Eighty per cent of admissions to Harper Hospital already had axillary involvement. When the axilla is involved the prognosis is 4 to 25 per cent cure; uninvolved the prognosis is 80 per cent cure. (5) There is substantial evidence that in breast cancer women are seeking advice and operation earlier than formerly, but in this matter it may be said that the surface only has been scratched. (6) Since the time factor is capable of such wide variation at our hands and is capable of such influence upon the ultimate prognosis, our best efforts should be directed

toward reducing the interval between appearance and eradication, toward transposing '80 per cent with axillary involvement' to '80 per cent clinically benign'. This will be realized only when popular information is so widespread that every woman regards a lump in her breast with dread suspicion as soon as, and not six months after, she first perceived it.

Hernaman Johnson⁹ says he distrusted the vehement cry of 'new lamps for old' when the Erlangen treatment was boomed early in 1921. He concludes as follows: (1) X rays are of great value in carcinoma of the breast. (2) The results are most striking in cases which have not previously been operated on. (3) Many advanced cases, still technically 'operable', and at present frequently operated on, would be better treated either by X rays alone, or in some cases by X rays in combination with minor operative procedures. (4) Very early cases should be operated on in the most complete manner possible. (5) All patients who have had carcinoma of the breast, no matter at how early a stage, should subsequently have a prophylactic course of X rays every few months for some years. (6) In dealing with the inoperable or recurrent case, no single curative method, Erlangen or otherwise, can be relied on. An individual case may require, in addition to X rays, ionization to heal ulcerated surfaces, surgery to remove refractory nodules, diathermy for pain; the injection of colloidal metals; and general measures.

Post-operative Swelling of the Upper Extremity following Operations on the Breast.—Hartshorn¹⁰ thinks that the extensive and persistent oedema so troublesome in some cases, and entirely absent in others, must be caused by some error in technique on the part of the operator, or some condition, either anatomical or pathological, not thoroughly understood.

The axillary vein is always carefully protected in all operations, but it is obvious that, in a complete dissection of the axilla, the normal *lymphatic circulation* must be interfered with to a great extent. The course of the lymphatics varies in different individuals, and may be an etiological factor of importance. Careful examination of almost any one of these cases gives one the impression of lymphatic, rather than venous, obstruction.

The relation of infection to post-operative oedema of the arm is dealt with by both Hartshorn and Halsted. Wherever *infection* is present in any part of the body, there we have swelling, usually of the oedematous type. It would be almost impossible to say in any specific instance that no infection had existed in so large a wound as that which is associated with the removal of breast carcinoma. Even a slight infection, almost imperceptible, might give rise to swelling of a considerable extent if located in an area adjacent to important lymphatic or venous structures. It is undoubtedly a very important etiological factor.

Pressure from scar tissue, either that caused by dissection of the axilla, or from cicatricial bands crossing the upper axillary fold due to the character of the incision, may be the cause of the oedema. The writer believes this to be an important etiological factor. It has been substantiated in his own experience, and in the experience of the Hopkins Clinic, for with the reduction of this pressure to a minimum, cases of post-operative swelling of the upper extremity have ceased to a very great extent. Brief reference may be made to the experiments at the Hunterian laboratory conducted at the instance of Dr. Halsted by Dr. F. L. Reichert and Dr. C. Y. Bidwell. In these, partial amputations were tried on dogs. All the tissues of the thigh were severed except the femoral artery and vein, the main nerve trunks, and the bone. The divided parts were carefully sutured. For seven or eight days there would be slight swelling of the leg below the line of suture. When this had subsided the femoral vein was ligated. No demonstrable increase in the size of the leg

occurred after this ligation. Later experiments included also the ligation of the femoral artery, with a similar result.

Granting from the observations previously made that the two factors most important in the causation of post-operative swelling of the upper extremity are pressure from scar tissue and infection, the question naturally arises as to how this condition can best be avoided. The following suggestions seem pertinent :—

1. *Incision*.—A straight incision commencing from a point below the middle or outer third of the clavicle carried to the upper border of the breast, which it then encircles, seems to accomplish the desired result most satisfactorily. This eliminates the curve over the deltoid and the upper axillary fold. On healing, the scar is practically straight or curves downward towards the



Fig. 26.—Carcinoma of breast. Incision as suggested in text. (By kind permission of the *Boston Medical and Surgical Journal*.)

axilla in such a way as to give a redundant skin area where most needed, that is, high up in the axilla (*Fig. 26*). Exposure of the insertion of the pectoralis major is easily made, and therefore the main reason for the old incision is eliminated. The dissection of the axilla is as readily completed as formerly.

2. *Dissection*.—The dissection of the axilla should be clean cut. All trauma to the axillary structures should be avoided, thus eliminating as far as possible injury to the peri-arterial sympathetics.

3. *Hæmostasis*.—Most careful attention should be paid to this.

4. *Drainage*.—Dr. Halsted has suggested the elimination of this. In one case a restricting band developed at the point of the drainage incision, but this is the only example of such an occurrence in the writer's experience. He

believes that the average surgeon is safer with drainage, because it affords an outlet for serum as being a useful precaution against infection.

5. *Closure without tension*.—The tendency is to do too little skin grafting. The technique at Halsted's clinic includes skin grafting and tucking in of the axillary fold in practically all the cases. As he says, this simple change has practically eliminated post-operative swelling. Plastic operations to secure closure should be avoided. This statement is made with full realization of the fact that physicians referring cases as a rule expect complete suture of the wound. This can in the majority of cases be secured; but is it not too often done at the expense of the patient's safety?

The writer concludes as follows:—

Post-operative swelling of the upper extremity is caused in the majority of cases by: (1) Extension of cancer cells; (2) Pressure of scar tissue and tension on skin flaps; (3) Infection; (4) Trauma to axillary structures during dissection. It can largely be avoided by: (1) Careful asepsis and hæmostasis; (2) An incision so placed that on healing it will not exert pressure from scar tissue on the upper portion of the axillary triangle; (3) Elimination of trauma in the dissection of the axilla; (4) The Halsted method of suturing the upper and outer skin flap high in the axilla, thus giving a redundant skin area where most needed; (5) Care in post-operative treatment: the forearm supported by a sling should be placed at right angles to the arm; the binder across the arm and chest should exert little pressure; passive motion should be commenced early.

REFERENCES.—¹*Ann. of Surg.* 1922, Sept., 359; ²*Surg. Gynecol. and Obst.* 1922, Aug., 217; ³*Ann. of Surg.* 1922, Sept., 346; ⁴*Ibid.* 341; ⁵*Boston Med. and Surg. Jour.* 1922, Aug., 243; ⁶*Jour.-Lancet*, 1922, xlii, 75 (abstr. in *Surg. Gynecol. and Obst.* 1922, July, 11); ⁷*Jour. Amer. Med. Assoc.* 1923, Feb. 7, 445; ⁸*Amer. Jour. Med. Sci.* 1923, March, 424; ⁹*Practitioner*, 1923, Feb., 177; ¹⁰*Boston Med. and Surg. Jour.* 1923, April 5, 477.

BRONCHIECTASIS.

W. H. Wynn, M.D., F.R.C.P.

ETIOLOGY AND DIAGNOSIS.—According to Piltz,¹ bronchiectasis in children is not so rare as is generally supposed, and many cases not recognized until late in life originate in childhood. The signs may be so ill marked at this age that the possibility of the condition should be considered in any pneumonia of unusually long duration. He considers that permanent changes in the lung tissue and pleura do not play an important part in its production; the essential change is the damage to the bronchial wall. Riviere² also calls attention to the origin of bronchiectasis in childhood, especially of those minor degrees less easily recognized than the gross lesion of the text-books. Bronchopneumonia stands out in childhood as the prime cause of lung damage, especially that following measles and whooping-cough. Influenzal pneumonia and tuberculosis are also important causes. After bronchopneumonia the signs at the bases of the lungs do not completely clear up after the child appears otherwise well. Further acute attacks may follow: sometimes a true bronchopneumonia, but often an acute catarrh of the dilated bronchioles with some congestion of lung tissue but no true consolidation. Tuberculosis may be simulated if the area of impaired resonance and crepitations is in an upper lobe. Such cases follow an apical lobar pneumonia. After the left base the right apex is the commonest site. The children are much less ill than they would be with tuberculosis of the same extent. Some will have cough and little sputum, others much sputum with occasional blood. The sallow skin, with wasting, and foul sputum, seen with bad cases of adult bronchiectasis, are much less common in childhood. Damaged lungs in adults are very commonly the inheritance of inflammatory diseases in childhood. Slight cases

show a basal bronchitis strictly confined to the bronchopneumonia area, generally as a chronic condition with acute exacerbations. Influenzal bronchopneumonia is an important cause. Many cases diagnosed as bronchopneumonia in adults may be acute catarrh in an old basal bronchiectasis which has been overlooked in its quiescent state.

Webb and Gilbert³ have made X-ray examinations of the accessory sinuses in all cases of chronic non-tuberculous chest disease, and find that there are few cases of bronchiectasis or chronic bronchitis in which infection of the accessory sinuses could not be shown. Bilateral empyema of the antra was most frequent, and sometimes all the sinuses were involved.

TREATMENT.—The surgical treatment of bronchiectasis is making headway. Rist⁴ reports several cases treated by **Artificial Pneumothorax**, and maintains that the method should not be used as a last resort, but should be regarded as the rational treatment of the disease and employed before it is too late. In some cases the pneumothorax may have to be kept up indefinitely. Perkins and Burrell⁵ report six cases treated by pneumothorax. As in other conditions, success depends upon the presence of adhesions. One patient, in whom the pneumothorax was kept up for two years, is quite well and free from sputum. Bogendoerfer⁶ reports a successful case treated by **Phrenicotomy**. This converts the corresponding half of the diaphragm from a tonic muscle to a passively moved membrane, and causes a decrease in the size of the pleural cavity and restricts the motion of the lung. Spontaneous reunion of the nerve-ends occurs after four months, and ultimately there is a complete return of the function of the diaphragm. The method is suitable for the treatment of bronchiectasis in the lowest portion of the lower lobe.

Graham⁷ states that radical surgery is unwise until less radical measures have been tried. The most radical measure is **Lobectomy**. There are two principal methods of operating: one by an intercostal route and the other by preliminary resection of ribs. The former is more brilliant, causes the least deformity, but is more dangerous. In the latter, subperiosteal resection of the seventh, eighth, and ninth ribs is performed from their angles to the anterior axillary line. The pleura is opened and adhesions are separated, the diseased lobe being surrounded and walled off by gauze packing. The gauze is removed gradually, and the space may be dakinized until clean. Amputation of the lobe is carried out as soon as the patient is in good condition and the cavity clean. Curved clamps are placed on the hilus, and the lung is cut away distal to the clamps. Mass ligatures may be applied, or the clamps left on for five to seven days. The wound is not sutured, but the flap of skin and muscle is allowed to fall into it. Irrigation is necessary, because a bronchial fistula is practically always present.

REFERENCES.—¹*Med. Science*, 1923, April, 10 (abstr.); ²*Brit. Med. Jour.* 1923, i, 141; ³*Med. Science*, 1923, April, 10 (abstr.); ⁴*Ibid.*; ⁵*Lancet*, 1923, i, 478; ⁶*Surg. Gynecol. and Obst.*, 1922, Dec., 405 (abstr.); ⁷*Ibid.*

BRONCHITIS.

W. H. Wynn, M.D., F.R.C.P.

Although the infective origin of certain forms of bronchitis is undoubted, there are others, better described as bronchial catarrh, in which infection plays little or no part. The older physicians laid much stress upon diathesis—gouty, arthritic, herpetic—in the causation of this latter group. Modern authorities, especially of the French school, regard them as anaphylactic phenomena. A distinction has long been made between infective coryza and the non-infective nasal hydroporrœa. A similar distinction can be made between infective bronchitis and certain non-infective bronchial catarrhs.

Bezangon and de Jong¹ describe the outpouring from the bronchial mucous

membrane of a watery fluid containing no albumin, a small quantity of mucus, and only a few degenerated epithelial cells. Some cases are acute, with a profuse secretion appearing and disappearing suddenly; others are chronic, with more or less marked exacerbations. They recognize three groups: (1) Catarrh due to anaphylactic reaction in the mucous membrane; this may be associated with, or alternate with, asthma, eczema, or urticaria. Cold, atmospheric variations, or digestive troubles may act as final exciting causes. (2) Cases with watery or thin mucoid secretion, described originally by Laennec as pituitous catarrh; they occur in cardiorenal disease, the bronchial mucous membrane acting as an organ for the excretion of water and sodium chloride. (3) Cases of purulent catarrh occurring in the absence of infection. It is claimed that leucocytes can emigrate through an intact epithelium and without desquamation of bronchial cells.

In the discussion on *chronic bronchitis*² at the annual meeting of the British Medical Association, 1923, Horder also emphasized the importance of associated constitutional conditions, and pointed out that in some cases infection played a minor part. Intermediate between the paroxysmal types and the true infective types there was the mucous diathesis. Hyla Greves laid stress upon such constitutional conditions as gout, alcoholism, arteriosclerosis, heart disease, and peribronchial tuberculosis. Perkins, Seccombe Hett, and others maintained that chronic bronchitis was usually secondary to some chronic pre-existing disease, especially of the upper respiratory tract. In children a poor airway and infected tonsils were a common predisposing cause. A deflected septum induced nasal catarrh and served to infect and re-infect the bronchi. Symes regarded Vaccine treatment favourably, and maintained that improvement was usual, cure frequent, and the patients were never made worse. Autogenous vaccines were desirable, and the dose of vaccine must be sufficient to excite reaction. Treatment must be continued for at least three months. Inman was disappointed with vaccine treatment, and divided cases from the bacteriological point of view into two classes: (1) streptococcal, in which vaccine treatment was intensely disappointing, and (2) Friedländer bacillus, the one type curable by vaccines.

Mackey³ has found considerable benefit by treatment with **Autogenous Vaccines**. In a paper based on 300 cases he describes his procedure. The sputum is obtained in the early morning after the patient has thoroughly washed out the mouth and throat with warm water. Cultures were also obtained from the nasopharynx by passing a tiny swab through the nose. Emphasis is placed upon the importance of keeping the sputum warm and delivering it to the bacteriologist without delay. Cultures from the swab are made on blood-agar and incubated immediately. Sputum sent through the post is quite unsuitable for making vaccines. Such a sample is dangerous because it is fallacious. In 130 cases the following germs were found in the sputum—pneumococcus 40 per cent, *M. catarrhalis* 32·5 per cent, *B. influenzae* 44 per cent, Friedländer's bacillus 8 per cent, *Streptococcus mucosus* 6 per cent, other streptococci 21 per cent, *Staphylococcus aureus* 0·8 per cent. In about half the cases the infection was a mixed one. The striking successes were obtained with pneumococci, influenza bacillus, Friedländer's bacillus, and *Str. mucosus*. He was not convinced that diphtheroid bacilli (*B. septus*) and streptococci other than *Str. mucosus* were of much importance. The nose was examined in 276 cases and was negative in 20. The 256 positive cases showed pneumococcus in 118, *M. catarrhalis* 82, *B. influenzae* 49, Friedländer's bacillus 38, *Str. mucosus* 20, other streptococci 29, *Staphylococcus aureus* 15, *S. albus* 7. In 173 cases the vaccine was made from the nose alone, either because the sputum was negative or because none could be obtained. These

vaccines were so successful that he was forced to the conclusion that the cause of bronchitis, and also of some types of asthma, is to be traced to an infected state of some part of the nasal passages. The bacteriological findings from the nose showed close similarity to those from the sputum. A truer picture of the infection is obtained if cultures are made from the nose as well as the sputum, and a more efficient vaccine can be prepared. A vaccine does not succeed because it rids the patient of his germs, but because it renders him unassailable for a certain period; during this time his symptoms may clear up completely, though he may continue to harbour his germs in undiminished numbers. Vaccines only effect a permanent cure in patients who cease to carry their nasal infection, but in carriers they confer a useful period of immunity.

McClure⁴ points out the evil influence of bronchitis in all stages of pulmonary tuberculosis. In many cases a bronchial catarrh quite definitely non-tuberculous is a factor determining the passage of a tuberculous lesion from a latent to an active state. A severe bronchitis in the course of an attack of pulmonary tuberculosis is generally an ominous occurrence, and must be regarded seriously. One clinical type of bronchitis deserves special mention: that which is the result of widespread pulmonary fibrosis. The bronchi become less elastic, and tend easily to show stasis, congestion, and inflammation. In treatment, stress is laid upon the importance of catarrhal conditions of the nasopharynx. Much more careful Climatic Treatment is required for these cases. In Europe they seem to do best in the quieter resorts of the Mediterranean littoral or among the foothills of the Alpes Maritimes, where a maximum of sunlight is obtainable in a climate that is equable and neither too humid nor too dry, and dust is at a minimum.

Krieg⁵ has applied the principle underlying Schultze's swinging of newborn infants to older children suffocating from tenacious bronchial and pulmonary secretions which they cannot expel. He applied the Schultze Method to infants; for older children he pushed the trunk forward and back till the head was below the seat, pressing rhythmically on the chest, repeating this a dozen times. The children all recovered. In other children he pressed the root of the tongue down with a spoon every two hours to induce retching. The aim is to get air into the lungs, and for adults he applies artificial respiration, raising and lowering the arms while compressing the sides of the chest. This has aided convalescence materially; but he warns that it should not be attempted until all recent inflammation has subsided.

REFERENCES.—¹*Presse méd.* 1922, Nov. 22, 1005; ²*Brit. Med. Jour.* 1923, ii, 235; ³*Ibid.* 1922, ii, 715; ⁴*Tubercle*. 1923, April, 293; ⁵*Jour. Amer. Med. Assoc.*, 1922, Dec. 9, 2044 (abstr.).

BRONCHOMONILIASIS.

W. H. Wynn, M.D., F.R.C.P.

Only within recent years has the frequency of mycotic infections of the respiratory tract been recognized. In 1910 Castellani drew attention to the part played by fungi of the genus *Monilia*, and published an account of 22 cases in Ceylon. Numerous other cases have since been reported, especially in Egypt, Italy, and South America. Joeke and Simpson¹ describe the disease and record six cases seen at St. Bartholomew's Hospital. The fungi are widely distributed, and are found especially on fruit, dead leaves, and wood. In the sputum they appear as round or oval Gram-positive, yeast-like bodies, sometimes showing a double contour (*Fig. 27*). Fragments of mycelium may also be found, often in bacillary or coccoid forms. Not infrequently tiny white particles, representing masses of growth, may be visible to the naked eye. Cultures are best obtained on slightly acid media containing glucose or maltose.

In man, direct case infection may occur, but more commonly it results from inhalation of contaminated particles. A cutaneous source has been suggested. Mixed infections are not uncommon, notably with the tubercle bacillus. In the milder cases the general health is not seriously impaired and there is very little fever. Physical examination shows signs of bronchitis or of bronchopneumonia. In more severe cases there are marked wasting and the signs usually associated with tuberculosis. Intermediate cases are not uncommon, and may run a prolonged course with one or more relapses. The diagnosis depends primarily on the repeated demonstration of the fungus in the sputum and the obtaining of a profuse growth from cultures on Sabouraud's medium. In two cases a fixation abscess resulted in pus containing the fungus. Agglutination and complement-fixation are sometimes of value. There is evidence



Fig. 27.—Fungi of *Monilia* group in sputum, appearing as round or oval yeast-like bodies.
(By kind permission of 'The Lancet'.)

that general dissemination by the blood-stream occurs, and blood cultures may sometimes help. Authorities are unanimous in their opinion that iodine is beneficial. For oral administration **Potassium Iodide** in large doses is sometimes effective, although **Tincture of Iodine** (French Codex) is a more active preparation. Castellani recommends **Salodin** (10 to 20 gr. t.d.s. in cachet). For intramuscular injection **Lipiodol** in doses of 1 to 2 c.c. daily is of use. Two cases were given **Autogenous Vaccines** in doses from 10 to 2000 million, but no reaction of any kind was observed. Mild cases tend to recover spontaneously, but efficient treatment considerably modifies the course and produces rapid improvement in many cases. To avoid relapse, the patient should be kept under the influence of iodine for some time after convalescence is complete.

REFERENCE.—*Lancet*, 1923, ii, 109.

BRONCHOSCOPY AND ŒSOPHAGOSCOPY. (See ENDOSCOPY.)

CALCULUS. (See KIDNEY; URETER.)

CAPILLARY PRESSURE.

Drs. C. Lian and L. Pollet.

(Translated by Carey F. Coombs, M.D., F.R.C.P.)

CAPILLAROSCOPY.—While diagnosis already enjoys the help of radiology, sphygmomanometry, and graphic methods in studying conditions of the heart, arteries, and veins, the capillary circulation has hitherto escaped examination

by methods available to the clinician. Physiologists have studied the capillaries in the mesentery of the frog, but no one has been able to find a technique for the examination of the human capillary circulation. Now, however, following Hueter,¹ who in 1879 observed the capillaries of the lips with the microscope, the American physiologist Lombard² has shown that, with a microscope and a good lateral illumination, the capillaries of the skin at the edge of the nail can be clearly distinguished if a drop of glycerin or cedar oil be placed on the surface of the skin. Many writers have explored this new domain³ and have confirmed, as we have ourselves, the fact that it is easy thus to see the human capillaries.

Technique of Capillaroscopy.—We use the microscope with a low-power objective, on the stage of which the finger is placed, illumination being secured by a 100-candle-power lamp on the hinged arm, adjustment to a distance which

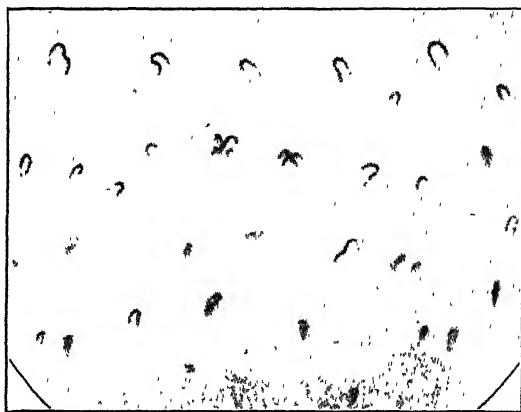


Fig. 28.—Normal appearance of capillaries. (By kind permission of the 'Journal of the American Medical Association'.)

will light the finger enough without heating it too much, being thus allowed for. Laubry and Meyer⁴ use the same technique. Fabre⁵ also interposes a quartz or a glass jar full of water between the finger and the light. To support the hand and wrist of the patient, and to prevent tremor, we rest the hand, wrist, and forearm of the patient on a sheet rolled to the appropriate height, while Laubry and Meyer have had made a grooved support on an inclined plane. Guillaume⁶ uses an apparatus consisting of a microscope without a stage, attached by a horizontal arm to a vertical support, with a lamp attached to the same support. He insists on the importance of illumination the direction of which is as near as possible to vertical. The patient's finger lies immediately on the laboratory table.

Normal Appearance of Capillaries (Fig. 28).—Using a fine adjustment, with care, one sees the capillaries appear as horizontal U-shaped loops, red, on a pale-rose background; the two branches of the U are not all of exactly the same calibre, that representing the arterial part of the loop being a little smaller than the venous portion. These loops vary much in form; the branches are not always parallel, sometimes crossing and even describing a figure of 8. At first no movement can be seen in the capillaries, but on careful attention it is clearly seen that the capillary content moves on, and

a kind of serpentine movement is described. To study these changes best, attention should be concentrated on one or two loops more clearly visible than the rest. These changes when first seen are very striking.

Applications of Capillaroscopy.—From hitherto unpublished investigations of our own with Lyon-Caen, also with Lauby and Meyer, and Boas⁷ and Guillaume, it appears that so far there is little of direct value to clinical medicine to be gained from capillaroscopy. Various accounts of changes characteristic of this or the other affection have been published, but they are not convincing. It is true that in acrocyanosis, and in cardiac insufficiency with cyanosis, the capillaries are large and the venous portion is dilated. In Raynaud's disease a spasm of the arterial limb with dilatation of the venous limb may be seen; but the picture may vary from case to case, and in thrombo-angiitis Boas has met with very valuable capillary appearances. The attempt has also been made to apply capillaroscopy to a comparison of the different methods of sphygmomanometry; but working with Lyon-Caen⁸ we found this kind of evidence might be full of errors; the fact is that fixed attention to the capillaries for some minutes is fatiguing, and remarkably favourable to autosuggestion. One observation has appeared to us definite; that is, at the moment that the arterial sounds reappear on deflation of the armlet, there is a sudden reappearance of a free capillary circulation. Boas has remarked that in aortic insufficiency the capillaries cannot be seen to pulsate by capillaroscopy. [Sumbal,⁹ examining the lip instead of the nail bed, states that a pulsatile flow can be seen in the capillaries in these cases.] In any case, capillaroscopy has shown in man, as physiologists had already shown in the frog, that the capillaries are not inert channels of communication between the arteries and veins, but that they have a life of their own. They may be seen to tighten up, to dilate, to appear in great numbers, or to disappear. This makes one wonder whether much of the circulatory disturbance in infectious diseases that is attributed to lesions of the myocardium may not be, after all, mainly due to a paralysis of the capillaries (see *Circulatory Failure in Diphtheria*, by Esther Harding¹⁰).

Measurement of Capillary Pressure.—The apparatus used is a tambour; the lower surface is a thin membrane applied to the skin, the upper surface being a glass plate. Air is driven by a bellows into the tambour, the internal pressure of which is measured by a manometer. Thus, with a microscope, the changes in the appearance of the compressed capillaries may be noted through the tambour. The mean normal capillary pressure is 20 mm. Hg, but this figure is only the average. The capillary pressure in a given subject must be determined by a number of observations which will give widely different results. For example, Boas found in a healthy person that the pressure lay as often between 11 and 20 mm. as between 30 and 40 mm. Hg.

REFERENCES.—¹*Deut. Zeits. f. Chir.* Bd. iv; ²*Amer. Jour. Physiol.* 1912-13, 335; ³*Presse méd.* 1921, Feb. 5; ⁴*Arch. d. Mal. du Cœur*, 1922, May; ⁵*Soc. Biol.* 1921, June 7; ⁶*Bull. Méd.* 1923, Oct. 24; ⁷*N.Y. Med. Jour.* 1923, May 2; ⁸*Concours méd.*; ⁹*Heart*, 1923, 271; ¹⁰University of London Press, Ltd., 1920.

CATARACT.

A. Bernard Cridland, F.R.C.S.E.

Lieut.-Colonel Coppinger¹ reports a case of cataract by lightning stroke occurring in the right eye of a child some two and a half months after the exposure. The type was that of the finely granular opacification which appears some time after the flash, as opposed to the traumatic type which occurs shortly after. The opacity was band-like, and situated in the lower half of the lens opposite the palpebral aperture with the lids half open.

Brose² records the development of cataract in an entire family of five persons, of the type known as congenital anterior capsular.

Inglis Pollock³ writes on the *treatment of early lental opacities by medicinal means*. He prescribes a lotion containing Sodium Acetate, Citrate, and Chloride, followed by either Trunacek's Solution or Merek's Fibrilysin in drops, increasing the strength where necessary. Sodium salts were used instead of potassium on account of the difficulty in obtaining the latter during the war; but the author considers that potassium salts should be preferred, especially in view of the interesting observation made by Burge, of Urbana, Illinois, to the effect that in the ash found in cataractous lenses the sodium was appreciably increased. Six cases are quoted in which partial disappearance of the opacities, with improvement in vision, was effected after some months of treatment. Cases where the visual acuity was less than $\frac{1}{12}$ were not considered suitable for treatment.

Morax⁴ considers that the formation of *secondary cataract* due to opacification of the posterior capsule after extracapsular extraction of the lens is not necessarily dependent on the stage of maturity at which operation is performed; neither does he think that the method of opening the capsule has any influence on determining whether or not a secondary cataract will form. The age of the patient, on the contrary, is a factor, in that in young subjects with congenital traumatic cataract, or those suffering from juvenile cataract, it is almost the rule to find opacification of the capsule to follow. Healthy lens débris alone is harmless, but if accompanied by a mild sepsis will give rise to a secondary complicated cataract. The procedure he prefers is that of extraction of the capsule after opening the anterior chamber, as opposed to simple discission, and he is of the opinion that two or three months should elapse after all inflammatory reaction has ceased before operating.

R. Affleck Greeves and R. Foster Moore⁵ give their experiences of the Barraquer Method of intracapsular extraction of senile cataract. The former's contribution is based on 51 extractions, which for the purposes of his paper are divided into three groups: (1) 31 successful cases; (2) 7 cases where the capsule ruptured, part being left behind and subsequently requiring needling; and (3) 13 cases where the lens could not be delivered by suction and the use of the scoop was necessary. In the majority of the latter very little vitreous was lost. His conclusion was that the result of a successful intracapsular operation left nothing to be desired, the pupil was black and free of membrane, the media were clear, and the visual acuity was excellent, whilst there was no undue amount of astigmatism. On the other hand, however, the method had shown itself to be less certain in its results than extraction without the capsule.

Foster Moore's paper is based on 38 cases, 22 of which were successful in every way and left nothing to be desired. In 5 some vitreous loss occurred, and in 11 other means had to be adopted to extract the lens, in 9 of which there was loss of vitreous. In one suppuration occurred, and evisceration was performed. In his opinion the advantages consisted in the absence of post-operative iritis and the obtaining of a uniform black pupil. The outstanding disadvantage was the frequency of vitreous loss and its consequences, the percentage in his experience being 23.7. He concludes that the operation contains a considerable element of danger, especially in the matter of vitreous loss, so that for general use it is inferior to the older methods, but that for immature cataracts and sclerosed lenses the Barraquer method has distinct advantages of its own.

Lagrange⁶ prefers the intracapsular method for extraction of cataract. After making the incision with a conjunctival flap, he tears off part of the anterior capsule and performs iridectomy. Prophylactic vaccines and anti-pneumococcus serum are used as adjuvants. He considers that the dangers

and possible accidents of the method of vacuum extraction in the capsule must not be underestimated.

REFERENCES.—¹*Med. Press and Circ.* 1923, Jan. 10, 32; ²*Amer. Jour. Ophthalmol.* 1922, ccii; ³*Glasgow Med. Jour.* 1923, Jan., 32; ⁴*Presse méd.* 1922, Dec. 16, 1089; ⁵*Lancet*, 1923, i, 897; ⁶*Médecine*, 1923, Jan., No. 4.

CEREBRAL TUMOURS. (See BRAIN, TUMOURS OF.)

CEREBROSPINAL FEVER.

J. D. Rolleston, M.D.

SYMPTOMS AND COMPLICATIONS.—F. J. L. Woltring¹ records 2 cases of *meningococcal septicæmia* and *latent meningitis*. In the first, in a man, age 19, recovery followed lumbar puncture and injection of **Antimeningococcal Serum**.

A. Lemierre and Piédelièvre² report the case of a man, age 44. The disease, after being purely septicæmic for nearly eleven months and being manifested only by attacks of intermittent fever, ended in meningitis which proved fatal in a fortnight in spite of treatment with antimeningococcal serum.

G. Comporti³ relates a case of *ambulatory cerebrospinal fever* in a man, age 19, whose only complaint was persistent headache. The temperature did not rise above 98·6°, vomiting occurred on only one occasion, nuchal rigidity was entirely absent, and there were no ocular symptoms, such as squint and inequality of the pupils. Lumbar puncture gave issue to 30 c.c. of turbid fluid containing meningococci. Recovery took place after **Repeated Punctures** without any serum being injected.

A case of *meningococcal meningitis with secondary streptococcal infection* is reported by Barbier and Lebée⁴ in a boy, age 8½, admitted to hospital with meningitis. Lumbar puncture showed a turbid fluid containing meningococci. Autopsy showed purulent meningitis, the pus containing numerous streptococci.

Cases of *purpura fulminans* due to meningococcus infection are recorded by A. Clerc, G. Perrochaud, and Boulanger-Pilet,⁵ and by Péhu and Bouchut.⁶

According to Dan McKenzie,⁷ epidemics of cerebrospinal fever differ considerably as regards the incidence of *deafness*. He has collected statistics of various observers, amounting to 140 cases, in which the deaf patients numbered 19, or approximately 14 per cent. As a rule both ears are involved, although unilateral deafness is sometimes found. The hearing is affected early, usually in the first or second week, rarely later. In many cases deafness is one of the first symptoms. Absolute deafness may occur in the mildest forms and even in abortive attacks of cerebrospinal fever, while on the other hand very severe cases of meningitis may recover without any loss of hearing whatever. The percentage of deaf cases which regain their power of hearing is unknown, but recovery even from absolute deafness may occur.

E. Chagas-Verde⁸ states that meningococcal infection of the eye in the form of *iridocyclitis* or *iridochoroiditis* is a rare affection. It may occur either as a sequel of cerebrospinal meningitis or as a primary localization of the meningococcus, whether the meninges be affected secondarily or not. In either case it is always the consequence of a previous blood infection. The lymphatic theory must be rejected, as no intercerebro-ocular lymphatic communication exists. Meningococcal iridochoroiditis is characterized by its rapid appearance, almost constant presence of hypopyon, slight degree of reaction, and extremely grave prognosis owing to the almost inevitable atrophy of the eyeball. The success of treatment depends upon early diagnosis. As soon as this is made, a few drops of antimeningococcal serum should be injected into the vitreous according to Netter's method, and the injection should be repeated several times until complete recovery takes place, though often a single injection is sufficient.

A. Levisseur⁹ reports a case of abnormal *adiposity* following meningococcal meningitis in a child, age 2½ years, whose attack of meningitis occurred at the age of 5 months. Skiagrams of the skull showed no bony abnormality in the region of the pituitary gland, and no sugar was found in the urine after administration of 50 grm. of glucose.

According to Abadie, Molin de Teyssieu, and Labuchelle,¹⁰ *mental sequelæ* are rare in cerebrospinal fever. The effect of serum treatment upon their incidence has been variously estimated by different observers. While Voisin and Paiseau are of opinion that these sequelæ have become more frequent since the introduction of serum treatment, as a larger number of patients survive, Netter maintains that the use of serum has caused a considerable diminution of psychical as well as of somatic sequelæ. The mental disturbances following cerebrospinal fever may be divided into two groups, according as they develop in the course of the disease, or, as more frequently happens, do not appear until several weeks later. An ordinary and an exceptional type may be distinguished. The ordinary type consists in a change of character, the child becoming irritable, indocile, and inattentive. There is also a diminution of memory with little or no intellectual enfeeblement. The exceptional type is characterized by an improvement or deterioration of the intellectual faculties. In the former case the child learns better or more quickly than before, his attention is more sustained, and his memory more active; while in the latter case there is a progressive deterioration, ending in dementia or idiocy. Patients of this kind also tend to show severe somatic lesions such as deafness or paralysis, and do not survive long. The anatomical substratum of these sequelæ is most probably a fibrous transformation of inflammatory lesions of the acute stage.

P. Coltelloni,¹¹ who devotes his thesis to a consideration of *relapses and seric meningitis* in cerebrospinal fever (see MEDICAL ANNUAL, 1919, p. 101), states that after a series of intrathecal injections of serum the disease may appear to be cured, but after about the ninth or tenth day fresh meningeal symptoms due to various causes may arise. Sometimes there is a seric meningeal reaction which is recognized by examination of the cerebrospinal fluid, which shows an aseptic puriform effusion, and by the frequent co-existence of other serum phenomena, such as urticaria and arthralgia. In relapses, the meningeal symptoms are the same, but the date of their appearance varies, the symptoms are not accompanied by urticaria, and, above all, the cerebrospinal fluid contains numerous meningococci. A fresh series of injections should only be given in cases of relapse, and then only after employing Besredka's method of a small preliminary dose, to avoid fatal anaphylaxis.

PATHOLOGY.—D. McKenzie⁷ points out that the route followed by the meningococcus from the nasopharynx to reach the meninges is still unknown, but, with the exception of the olfactory cribriform hypothesis, there is something to be said for every one of the following suggestions: (1) The meningococcus passes by way of the sphenoidal sinus and bone. (2) It passes into the blood-stream to produce general septicæmia, of which the meningitis is merely one of the manifestations, or passes through the circulation without producing septicæmia. (3) It passes, like the ordinary bacteria of suppuration, via the Eustachian tube and middle ear to the labyrinth and meninges.

TREATMENT.—The use of **Immune Cerebrospinal Fluid** in this disease is described by E. Thomas,¹² who reports a case in which he injected intrathecally cerebrospinal fluid taken from a case of hydrocephalus following cerebrospinal fever, in doses of 10 to 15 c.c., with surprisingly good results. All the symptoms disappeared in six days. Four days after the temperature had fallen to normal there was a sudden return of the symptoms, which was cut short by

The relative importance and frequency of these, as well as the mechanism of their causation, have given rise to much discussion.

Stivelman¹ holds that pleuropulmonary reflex is the chief cause of serious symptoms. He has analysed the data accumulated during the last five years from 162 punctures for initial pneumothorax and 1824 secondary punctures for gas refills. Anaesthetization of the needle tract with novocain-adrenalin preceded all punctures, and primary punctures were supplemented by subcutaneous injection of $\frac{1}{8}$ gr. morphine. Among the 162 primary punctures, pleuropulmonary reflex was met with in 7 patients, in 3 of whom the attacks recurred on subsequent attempts. Three of the attacks were mild, 6 severe, and 1 fatal. The most severe and outstanding symptom was cardio-respiratory embarrassment. It was present in all. It was of the vago-inhibitory type in 3 and vasomotor in 7, the former being characterized by slowing of respiration and slowing and increased force of the pulse; the latter by rapid, shallow breathing, and rapid, feeble, and finally imperceptible pulse and heart-beat. Unconsciousness was noted in 4, tonic and clonic muscular contractions in 5, and temporary paralysis in 7. Amblyopia was noted in 3, and loss of control of sphincters in 1. Precordial pain was severe in 4. In 7 cases injury to the visceral pleura and underlying lung occurred, as shown by hæmoptysis. In 6 of these cases physical and X-ray examination showed extensive infiltration and fibrosis beneath the point of puncture, and attempts at pneumothorax failed. On the other hand, among the 1824 punctures for refills when the pleural surfaces were widely separated and the needle could not injure the visceral pleura or lung, the accident occurred but twice. In one the lung had unexpectedly re-expanded and hæmoptysis occurred; in the other there appeared to be separation of an adhesion. He concludes that in over 75 per cent of cases there is definite evidence of injury to the lung or visceral pleura, that in these cases the lung underlying the point of puncture is the seat of an acute lesion, and that the reflex practically never occurs when the pleural surfaces are widely separated or when the parietal pleura alone is punctured after anaesthetization.

Du Bray² classifies the causes of the symptoms as follows: (1) Pleural reflex. (2) Pulmonary lesions produced by the puncture: mixed group, constant in one particular, in that there is always a demonstrable lesion of the lung, either lacerations or puncture wounds caused by the needle, or definite pulmonary congestion. (3) Air embolism. (4) Pulmonary oedema: this usually follows drainage of the pleural cavity, though it may occur after simple exploration. (5) Other pulmonary lesions such as pulmonary thrombosis or hæmorrhage. (6) Spontaneous pneumothorax. He records the case of a woman, age 23, who was thought to have a pleural effusion following an operation for removal of a tuberculous kidney. An exploratory puncture was made in the right seventh interspace in the posterior axillary line after anaesthetization with novocain. No fluid was obtained, and the trocar was partially removed and then thrust forward in several directions. Suddenly the patient became cyanosed and the body stiff; loss of consciousness followed; respirations became laboured, with tracheal râles. Adrenalin and atropine were given, and artificial respiration with oxygen. The pulse rose to 150 to 200. Half an hour later a right-sided extensor plantar reflex was obtained, with double ankle-clonus and jaw-clonus; the pupils were dilated and did not react to light. The patient did not recover consciousness, and died in twelve hours. Post mortem the lungs were found adherent, and at the site of the puncture in the middle lobe of the right lung was an extensive hæmorrhage; both lungs showed considerable oedema and congestion. There was no evidence of air embolism.

Schlaepfer,³ in an excellent critical review, maintains that air embolism and not pleural reflex is the cause of symptoms. He has demonstrated by experiments that there is not a pleural reflex even in the normal pleura which would explain these symptoms. The pathological condition of the lung and the pleura is the same in all cases. The lung tissue shows, in a circumscribed area, a condition which is partly an infiltration, partly an induration of the tissue, where the blood-vessels, especially the veins with their weaker walls, are fixed in a distended condition. When mechanically injured they cannot, with these rigid surroundings, collapse as usual: the hole remains open. The distance of the wounded vein from a branch of the larger pulmonary vein under negative pressure, which can aspirate the air, decides whether the air embolism will become evident. Absence of this condition is the reason for the infrequency of air embolism. The clinical picture of these cases varies considerably. Pallor is often the first sign of danger. Circumscribed patches of cyanosis on the skin give a marble-like appearance. The patient complains of sudden pain in the chest on the affected side. He cries out, saying that he feels giddy and has black spots before the eyes. He may become totally blind. Unconsciousness comes on suddenly. The pulse becomes imperceptible. Dyspnoea passes into stertor; the breathing becomes gasping and finally stops. Involuntary evacuations precede death. The pupils are widely dilated and do not react. After passing through the preliminary stages, the attack may come to an end and the patient recover consciousness. In the majority of cases clonic or tonic convulsions give evidence of excitation of the motor areas, beginning in the eye muscles or arm, and often becoming general. The contractions are followed by paralysis of varying duration. Usually it lasts only a short time, but may continue for several days. Ophthalmoscopic examination is of great importance, as air may be seen passing through the retinal arteries.

Lillingston⁴ also holds that the importance of pleural reflex as a cause of sudden death has been greatly exaggerated, and that nearly all the sudden deaths associated with puncture of the chest are due to gas embolism. While the fate of the patient into whose systemic circulation air has escaped depends upon the amount of air reaching the lungs, and passing thence to the heart and brain, the matter is very different when air enters the pulmonary veins directly. Even a small quantity may cause serious air embolism of the brain, the fate of the patient being determined by the site of the embolism in the brain rather than by the quantity of air introduced into the circulation.

PROPHYLAXIS.—The belief that an exploratory puncture of the chest is a perfectly safe procedure has caused it to be used with undue frequency. Many explorations give negative results, and might have been avoided if the physical signs had been more carefully studied and fuller use made of X-ray examinations. When there is a definite indication for exploratory puncture, the entire needle tract should be carefully anaesthetized. Tablets of novocain 0.02 gm. and adrenalin 0.00005 gm. dissolved in 1 c.c. of normal saline give a 2 per cent solution of novocain and can be conveniently carried in the hypodermic syringe case. Only exceptionally is a needle longer than 3 cm. required, and aspiration can be done through the anaesthetizing needle except when the exudate is thick. When fluid is not at once obtained, added caution is necessary, as the chance of injuring the lung is greater. Under no circumstances should the needle be moved laterally or its point allowed to inscribe arcs of a circle. It is safer to make several punctures at different points than to move the needle in several directions from one point. The chances of accident are even greater in initial attempts to produce artificial pneumothorax. A point of puncture as far away as possible from the main lesion should be chosen. It is safest to go into an area giving good resonance on percussion and good

breath sounds on auscultation. The practice of asking the patient to cough while the needle is in the chest cavity, so as to increase the manometric oscillations, must be condemned. The head of the patient should be bent to one side, so that it is not the highest point of the body. With the head in this position, air bubbles do not tend to reach the brain capillaries.

TREATMENT.—When symptoms have appeared, the needle must at once be withdrawn. Artificial respiration must not be done, as it would favour the entrance of more air. Morphine must not be used owing to its paralytic action on the respiratory centre. If the breathing stops, rhythmic **Traction of the Tongue** should be practised, and **Faradization** of the phrenic nerve. An intravenous injection of **Adrenalin** should be given to reinforce the heart's action, and the head should be lowered. **Camphor**, and **Ether** and other diffusible stimulants, can be injected subcutaneously. As Lillingston remarks, "it is well to try these remedies; but once gas embolism has occurred, the patient's fate is little influenced by human fussing, and is in the lap of the gods".

REFERENCES.—¹*Amer. Jour. Med. Sci.* 1923, June, 836; ²*Ibid.* March, 357; ³*Johns Hop. Hosp. Bull.* 1922, Sept., 321; ⁴*Tubercle*, 1923, Feb., 193.

CHEST, SURGERY OF. (See THORACIC SURGERY.)

CHICKEN-POX.

J. D. Rolleston, M.D.

SYMPTOMS.—Three cases of *haemorrhagic varicella* have recently been reported by W. McC. Wanklyn,¹ W. Hoffmann,² and Floriano de Lemos³ respectively, showing that the condition is probably due to some constitutional factor and (since two of the three patients recovered) is not always fatal.

According to M. Leray,⁴ who has collected all the cases of *gangrenous varicella* on record since 1850, including one of his own, the majority of cases have been reported in Anglo-Saxon literature, and most of the remainder by French writers, only a few examples having been published in other countries. His own case was remarkable for two phenomena which have not hitherto been described in gangrenous varicella, namely, azotæmia and acidosis. Further observations, however are required to show whether these are constant features of the condition. Leray points out that a necrotic process may occur in any of the eruptive fevers, as well as in certain skin diseases in children; and its occurrence alike in measles, scarlet fever, ecthyma, and pemphigus, as well as in varicella, suggests that it is associated with a special predisposition of the subject. The necrosis occurring in varicella does not possess any specific characters.

A. Reiche⁵ refers to Sack's recent paper (see MEDICAL ANNUAL, 1923, p. 125), in which the severity of an attack of chicken-pox was attributed to previous treatment with ultra-violet rays, and states that in 20 cases of varicella under his observation which had undergone this treatment, the attack was not more severe than in those not so treated. He therefore cannot confirm Sack's suggestion that ultra-violet rays are liable to produce a severe eruption by sensitization of the skin. The increasing severity of varicella in recent times, to which Stoeltzner has also alluded (see MEDICAL ANNUAL, 1921, p. 506), must be attributed to other causes, especially diphtheria, congenital syphilis, and tuberculosis.

DIAGNOSIS.—In discussing the diagnosis from small-pox, W. McC. Wanklyn⁶ points out that the eruption in varicella is frankly *centripetal*, i.e., it shuns the distal parts of the extremities and accumulates on the central parts and on the trunk. In difficult cases a count of the spots on these various parts can rapidly be made. The typical lesions of varicella are to be found in the flank, where it is possible to note their superficial character by rolling the

lesions between the finger and thumb, the fact that the long axis lies parallel to the natural folds of the skin, the wrinkled outline, and flaccid nature of the lesion. The lesions on the face and extremities should not be chosen for comparison, as on these sites the rash is more difficult to distinguish from variola than elsewhere.

If the diagnosis from small-pox still remains doubtful, the development of the disease from day to day should be watched, as it widely differs in the two diseases.

REFERENCES.—¹*Brit. Med. Jour.* 1922, ii, 977; ²*Schweiz. med. Woch.* 1923, 250; ³*Arch. Brasil. de Med.* 1922, 475; ⁴*Thèse de Paris*, 1922, 139; ⁵*Munch. med. Woch.* 1923, 360; ⁶*Brit. Med. Jour.* 1922, i, 1228.

CHOLERA.

Sir Leonard Rogers, M.D., F.R.C.P., F.R.S.

M. Mijajima¹ describes the epidemics of cholera during a decade in Japan and her colonies of Korea and Formosa, and traces their origin to spread from Southern China. In Japan there were outbreaks in 1912-13, 1916-17, and 1919-20, with respectively 2798 cases and 1705 deaths in the first, 11,265 cases and 6801 deaths in the second, and 2912 cases with 915 deaths in the third. In Korea there were six severe epidemics between 1900 and 1919, the last, which was introduced from Manchuria and Vladivostock, being the most severe, with 16,991 cases and 11,084 deaths, while in 1919-20 there were 6505 cases and 4371 deaths in Formosa, which is frequently infected from Southern China. Kwantung Leased Territory also suffered severely in the same epidemic, Northern and Southern Manchuria having 44,833 cases with 27,088 deaths. Experience has shown that the Chinese authorities, including the municipality of Shanghai, cannot be relied on to report outbreaks of cholera in time to allow Japan to take measures to prevent the disease being introduced into her territories, so Japanese medical officers have been placed in important Chinese and Philippine ports to collect information, much trouble having been caused by a lack of effective epidemiological intelligence in the Far East.

Japan has taken stringent measures to prevent the importation of cholera, all arrivals from infected ports having their faeces examined for cholera organisms, and in 1922 the quarantine law of 1899 was strengthened to permit of all cholera carriers, as well as cases of cholera, being isolated. Anti-choleraic inoculation has also been carried out in infected areas on a large scale, 1,444,318 persons having been inoculated in Korea during the last serious epidemic with very good results, most receiving the usual two injections; but where this was not possible, a single large dose of 1 c.c. was found to produce only a slight reaction and to be even more satisfactory than the ordinary method.

M. Tsurumi and T. Toyoda² record their experience of cholera acidosis and its therapy in Manchuria, and confirm the previous work of Sellards and Rogers, which established the great reduction of the alkalinity of the blood in severe cases of cholera, especially those developing uræmia, and the value of injections of Bicarbonate of Soda in combating it, the case mortality in Manchuria having been reduced by this addition to the saline or serum treatment from 42.7 per cent of 480 cases to 28.4 per cent. They also confirmed Rogers' observations on the reduction of the chlorides in the blood in cholera, and the value of Hypertonic Salines in raising them. J. W. Tomb,³ in the Bengal mining districts, found the saline treatment of cholera impracticable; and the Kaolin one, although effective in reducing the mortality from 50 to 25 per cent, was unpopular; but that 1-drachm doses, in half an ounce of water every half hour, of the following mixture of essential oils, gave a low case mortality and was also of value as a prophylactic in the limited trial he has

yet been able to make of it : Spt. Æther, 30 min.; Ol. Cloves, Ol. Cajuput, and Ol. Juniper each 5 min.; acid sulph. aromat., 15 min. The number of cases treated is not mentioned.

REFERENCES.—¹*Jour. Trop. Med. and Hyg.* 1922, Nov. 1, 337; ²*Arch. of Internal Med.* 1922, Dec., 797; ³*Ind. Med. Gaz.* 1923, June, 257.

CHOREA.

Sir James Purves-Stewart, K.C.M.G., C.B., F.R.C.P.

The syndrome of chorea is usually classified under three main groups: (1) The toxi-infectious group, including Sydenham's chorea and chorea gravidarum; (2) The hereditary group, comprising Huntington's chorea; and (3) The focal organic group, including choreiform movements occurring after epidemic encephalitis and certain hemiplegias.

Chorea minor is now generally regarded as due to a diffuse or disseminated encephalitis, affecting chiefly the corpus striatum and involving the cortex and the pia arachnoid. It seems more than probable that the organism responsible for this encephalitis is the same as that which causes the carditis and arthritis of rheumatism. The lesions have been most constantly found in the caudate nucleus and the putamen, whereas the incidence of cortical lesions is very irregular and may be easily overlooked.

It will be remembered that chronic degenerative lesions in Huntington's chorea are also located in the corpus striatum and the cortex.

Lastly, amongst the residual phenomena following epidemic encephalitis, quite a large proportion of cases have a phase of choreiform movements, lasting for several weeks, then clearing up and being followed by the Parkinsonian syndrome.

Turning to the symptomatology of chorea, we note that, in addition to the ordinary spontaneous restless movements, the inco-ordination during voluntary movement, and the muscular weakness with hypotonia, a certain proportion of cases show well-marked *mental symptoms*. In the early stages of chorea, when the choreic movements are mistaken for childish restlessness, the character is already markedly altered. As the disease progresses and the choreic movements become marked, mental disturbances, not only in the sphere of the sentiments and of will power, but also in that of intellectual processes, become pronounced. Sometimes distressing hallucinations develop. Hammes,¹ in a series of 88 cases of chorea, found definite symptoms of this mild psychosis in 18. There was no uniformity in the mental picture, except that distressing hallucinations were frequently present. The mental symptoms ran a short course and cleared up completely. All this is suggestive of a toxic variety of psychosis.

Treatment by Passive Hyperæmia.—It is now a number of years since Bier introduced to the profession his method of passive hyperæmia for the treatment of various inflammatory affections of the limbs. He has since applied similar Artificial Hyperæmia in the treatment of certain cerebral affections, notably in epilepsy and chorea. He claims that in chorea encouraging results are often obtained after all the usual medicinal remedies have failed. The method consists in applying an elastic bandage round the neck, the skin being previously protected by a layer of lint. Or we may employ the hollow rubber bag of an ordinary blood-pressure manometer bandaged around the neck, whereby the amount of constricting force can be accurately measured. The extent of pressure varies from 80 mm. of mercury upwards. The elastic pressure is applied at first for several hours daily, gradually increasing the periods of compression until at last the child wears the constricting bandage as many as twenty-two hours out of the twenty-four. Little or no discomfort is produced, apart from the unaccustomed pressure, especially if the skin is

made comfortable by lint or by rubbing with alcohol. No drugs are given during the treatment, nor is the patient isolated.

Esau² has recorded observations on a series of six cases of chorea thus treated; 2 were first attacks, the other 4 were cases of obstinate and recurrent chorea. All of them were cured, generally within two or three weeks, thus contrasting with the usual course of chorea, which lasts for several months. Improvement, according to Esau, occurs as a rule not uniformly, but in somewhat sudden jumps. Relapses sometimes occurred, but were readily controlled by re-application of the constriction.

The precise method whereby artificial cerebral hyperæmia benefits chorea is still a matter of speculation. Modern pathology points to the corpus striatum as the site of the lesion in chorea. If this be a toxic affair, it is not unreasonable to suppose that the passive hyperæmia acts by altering the circulation of the diseased nerve-cells, enabling them to get rid of their toxic infection. In any case, whatever the explanation, it is evident that we have a useful therapeutic weapon added to our armamentarium.

REFERENCES.—¹*Jour. Amer. Med. Assoc.* 1922, Sept. 2, 804; ²*Munch. med. Woch.* 1923, June 22, 810.

CLUB-FOOT, CONGENITAL. (See BONE AND JOINT SURGERY.)

GOAL-GAS POISONING.

Herbert French, M.D., F.R.C.P.

In view of the large number of cases of coal-gas poisoning which have been reported in the papers during the last year or so, a paper by Henderson and Haggard¹ on "The Treatment of Carbon Monoxide Poisoning by means of Oxygen + CO₂ Inhalation" contains an account of valuable work on this subject, and some excellent and practical suggestions for the treatment of these cases. First of all they review the principal methods of treatment of carbon monoxide poisoning. These are:—

1. *Bleeding*, for which there is no adequate reason, but rather the contrary.
2. *Transfusion*, which is probably quite ineffective, for in order to be beneficial it would have to be performed within one hour or at most two hours after the gassing.
3. *Artificial respiration* sometimes plays a crucial part in the resuscitation of the victim by restarting spontaneous breathing; but in many cases which end fatally hours or days later, the breathing may never have stopped.
4. *Oxygen inhalation* offers the one promising line of attack, but it has failed in many cases for various causes, the most important of which are, first, that there has been no really efficient apparatus available for administering the oxygen. Secondly, its application has been too long delayed; the carbon monoxide comes off from the blood so slowly during the first two or three hours that although the patient is removed to fresh air the brain continues to be asphyxiated; and if this is allowed to continue for four or five hours the brain never recovers from the œdema and resulting degenerative processes. Thirdly, as the result of the prolonged asphyxiation with long duration of coma, the respiration and circulation have become so depressed that oxygen, which is not in itself a respiratory stimulant, is by itself ineffectual, for so little of it reaches the lungs and blood-stream that only very little carbon monoxide is displaced from its combination with hæmoglobin. It is well known that it is the amount of carbon dioxide circulating in the blood which regulates respiration and stimulates the respiratory centre. Experiments on asphyxiated dogs have shown that the addition of carbon dioxide to the oxygen inhaled stimulates the respiratory centre within a minute or two, so that the breathing first of all returns to normal, and then to the maximum pulmonary ventilation of

which the animal is capable, with the result that the carbon monoxide is completely eliminated from the blood in from twenty to twenty-five minutes. In experiments on human subjects, it was found that administration of a Mixture of Oxygen with 5 per cent CO_2 augmented the breathing from 300 to 500 per cent, while a blood concentration of carbon monoxide of from 40 to 50 per cent saturation was reduced to the quite harmless amount of 10 to 12 per cent saturation in half an hour.

The writers invented an improved inhaler, which is illustrated in *Fig. 29*. Two firms in New York supplied the required mixture of oxygen and carbon

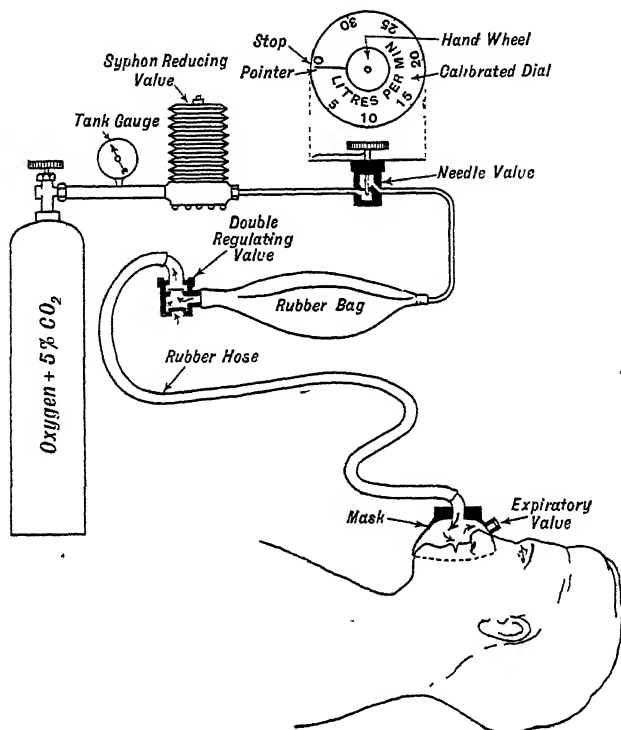


Fig 29—Henderson and Haggard's treatment of carbon monoxide poisoning by means of oxygen + CO_2 . (Redrawn from the 'Journal of the American Medical Association'.)

dioxide, and by means of an organized service with motor ambulances arrangements were made so that any case of coal-gas poisoning could be notified by telephone and reached with little delay.

The following instructions are sent out with each inhaler, and speak for themselves:—

Directions in Brief.—(1) Open valve at top of tank. (2) Put mask on victim. (3) Turn pointer on dial to 10. (4) Keep advancing pointer as victim breathes more. (5) Use for from twenty to thirty minutes.

Detailed Directions.—(1) This apparatus is charged with oxygen and another gas (CO_2) which makes the victim breathe many times the amount he otherwise would. It makes him pump the illuminating gas out of himself. (2) If

the victim has stopped breathing before you arrive, apply both manual artificial respiration and the H.-H. inhalator. If anything will start him breathing, this inhalation will. (3) In using the inhalator, open the valve at the top of the black gas bottle. See that the pointer on the nickel-plated dial is turned as nearly as possible to 0. (4) Put the mask over the victim's face. The lower part goes well below the chin. Press down firmly over the nose. Prevent leaks. (5) When the pointer on the nickel-plated dial is at 0 the victim breathes air, which he draws in through the inlet valve below the T at the end of the long rubber hose. (6) As soon as the mask is on the victim's face, turn the pointer to 10. This lets gas run from the tank into the rubber bag. The victim breathes this. If he breathes more than runs in, the bag collapses and he draws in additional fresh air through the inlet valve. (7) As the victim's breathing increases, turn the pointer on the dial so as just to keep the bag from collapsing each time he breathes in. (8) If the victim goes well, the breathing will increase to 25 or 30 litres a minute—as shown on the dial—during the first five minutes. (9) Keep the pointer at about 25. (10) Usually twenty minutes of use of the inhalator is all that is necessary, but it may be given in severe cases for forty minutes. More than this merely wastes the oxygen + CO₂.

The authors summarize the outstanding facts regarding the administration of oxygen and CO₂ to patients suffering from coal-gas poisoning as follows: Not a single case of observable ill-effect occurred, and the heart was in no case adversely affected. In every case the respiratory response to the inhaled CO₂ consisted in a rapid increase in the volume of the breathing up to full and deep pulmonary ventilation. Some patients were barely breathing when treatment was begun, and in some it had to be started by means of artificial respiration. All in whom there was still life responded effectively. The reduction of CO₂ in the blood was extremely rapid. The conclusions they reach are:—

1. Manual artificial respiration by the prone pressure method should be employed when respiration has stopped, supplemented by administering the 5 per cent CO₂ mixture with oxygen.

2. Inhalation of oxygen and 5 per cent CO₂ causes a full ventilation of the lungs, a rapid elimination of the carbon monoxide, and terminates the asphyxia. It requires only general medical supervision, and can be applied by any intelligent men with a little previous instruction.

3. They advise against any other method of treatment such as injections, bleedings, transfusions, and the like.

It is of vital importance that as short a time as possible should be allowed to elapse between the discovery of the victim and the application of the method; the sooner it is applied, the quicker and more complete the recovery.

It would be well if our municipal authorities could arrange a service of this nature which could be undertaken by the police or the fire brigade, so that the method could be applied on the spot with little or no delay.

REFERENCE.—*Jour. Amer. Med. Assoc.* 1922, Sept. 3, 1137.

COCCYX, INJURIES TO.

Sir W. I. de C. Wheeler, F.R.C.S.I.

It is often difficult to make out what are real and what are imaginary complaints in connection with pain and tenderness in the region of the coccyx. Neuralgia without nerve lesion is spoken of. Neuritis, the result of pressure of the fetal head on branches of the sacral plexus during labour, is also mentioned; and of course gross injury producing fracture, dislocation, fusion, or caries, accounts for coccydynia. Fissure in ano should not be forgotten as a cause. Injection of 80 per cent solution of Alcohol into the tissues where tenderness is most easily elicited is recommended by Yeomans (see MEDICAL

ANNUAL, 1921, 119), 10 to 20 min. at each point. If injections fail, **Excision of the Coccyx** is a simple operation.

Cyriax¹ refers to *minor displacements of the coccyx*. They always occur at the articulation with the sacrum, most commonly in females, after direct violence. Amongst other causes are rheumatic fever, straining at stool, pelvic cellulitis, a sudden effort to save falling. Displacement is usually forward. Cyriax speaks of kyphosis and lordosis of the sacrococcygeal region. He has not seen minor lateral and minor rotary displacement. The symptoms are analogous to minor displacements of bones elsewhere. The sitting position on a hard seat usually brings about pain; it is often increased during defaecation. The patients often sit sideways on a chair, and constantly change their position. He thinks that **Reposition of the Displaced Bone** is generally quite easy without anæsthetics. The bone is grasped with the forefinger and thumb and gently moved backwards and forwards and, if needs be, also from side to side with gradually increasing range, then with a sudden movement the bone is replaced. Immediate relief is the result. Manual vibrations over the coccyx are recommended, followed by passive movements of flexion and extension of the affected joint. It is thought that a large proportion of excisions of the coccyx can be avoided by this measure.

REFERENCE.—*Glasgow Med. Jour.* 1922, Aug., 118.

COLITIS, ULCERATIVE.

Robert Hutchison, M.D., F.R.C.P.

A discussion on this subject took place at the Royal Society of Medicine last year.¹

ETIOLOGY.—It was generally agreed that the disease is one occurring chiefly in early adult life, that it affects both sexes almost equally, and that the diagnosis can only be made satisfactorily by means of the sigmoidoscope. The etiology is quite uncertain. There are some who regard the disease as simply sporadic bacillary dysentery in which secondary infection by various types of intestinal organisms has occurred. The majority of observers, however, are of opinion that it is not a specific disease, for numerous organisms—*B. coli*, *B. pyocyaneus*, pneumococci, and streptococci—may appear to be the predominating and causal agents. All are agreed that it is in no way related to amœbic dysentery. Dudgeon, in six cases in which scrapings had been examined from the ulcers, found in one a Flexner bacillus, in four a hæmolytic colon bacillus in almost pure culture, and in one case hæmolytic streptococci and a *Staphylococcus aureus*. He is opposed to the view that ulcerative colitis and true dysentery are always caused by the same organisms, but considers that in every case the infective agent can be determined by investigation on the following lines: (1) Examination of the bowel by the sigmoidoscope; (2) If ulceration is present, material from the floor of the ulcer should be submitted to detailed bacteriological and protozoological investigation; (3) Repeated examination of the fæces; (4) Examination of the blood, more especially in relation to the presence of immune substances in the serum. In regard to the last method, the experience of the present writer in a considerable number of cases of ulcerative colitis has been that the patient's serum does not agglutinate any type of dysentery bacilli. A specially interesting form of the disease is produced by pneumococcal infection. In two cases of this sort described by Lockhart-Mummery there was excessive hæmorrhage and a high temperature. Neither patient had had pneumonia.

TREATMENT.—The general management of the patient consists in **Rest**, preferably in the open air, with an abundant but **Unirritating Diet**. Drugs are of little use, though benefit sometimes follows from the administration of Salicylate of Bismuth. The effect of **Vaccines** is very uncertain. If used at all,

a mixed autogenous vaccine is best. Hurst claims very good results from the intravenous injection of the Polyvalent Antidysenteric Serum of the Lister Institute; 40 c.c. should be given the first day, 60 the next, 80 the third, and 100 the fourth. The four injections are often sufficient, but it may be necessary to repeat the maximum dose two or three times. There may be a considerable reaction, with rise of temperature, a rash, and joint pains, but these effects are transient. They are less likely to occur if 15 gr. of calcium lactate are given three times daily during the treatment and for a day preceding it. Hurst regards the benefit of this treatment as specific, and not merely due to the horse serum. If confirmed, his results would be strong evidence in favour of the dysenteric origin of many cases.

Local treatment consists in *Lavage of the Colon*. This may be done per rectum with the patient in the knee-elbow position. There is no need to introduce the tube more than four inches. The injection should be at body temperature. An immense number of different solutions have been employed, but it is probable that benefit is derived chiefly from the mechanical effect of the washing. The fluid should be rather hypotonic, so as to prevent any dehydration of the patient, and if an antiseptic is added, weak permanganate (1-5000), 2 per cent iodine, flavine, or 2 per cent peroxide are as good as any. It one desires to use an astringent solution, one of the organic salts of silver is best. Ordinary silver nitrate should be avoided, as it has been known to produce argyria.

If the patient does not rapidly improve under these measures, an opening should be made in the colon so as to permit of more thorough irrigation. Appendicostomy seems to be the operation of choice. A catheter should not be tied into the stoma, but passed as required, and the opening should not be allowed to close for at least a year, owing to the great tendency of the disease to relapse. [In one of the reviewer's cases irrigation was carried out at intervals for two years, during the whole of which time the patient was able to carry on his work as a farm labourer.—R. H.]

RESULTS OF TREATMENT.—It would appear that, largely owing to the adoption of earlier operation, the prognosis of the disease has considerably improved. Ten years ago the mortality was about 50 per cent. Now it is 15 per cent (Lockhart-Mummery). Stricture never results from healing of the ulcers, but it may follow cæcostomy. Relapses, even after an interval of years, are, however, a common experience.

REFERENCE.—¹*Lancet*, 1923, i, 939 and 1006.

COLON, SURGERY OF.

E. Wyllys Andrews, M.D., F.A.C.S.

Ulcerative Colitis.—In many cases of ulcerative colitis the symptoms become so severe that life is threatened and radical surgical measures are not only justified but necessary. Krogius¹ and Stone² are of the opinion that nothing short of total side-tracking of the faecal stream around the ulcerative area is of any avail. Krogius believes that it is sufficient simply to implant the ileum into the sigmoid. He says that backing up and distention of the excluded bowel will not occur on account of its spasticity and narrowed lumen. He has observed very little relief from irrigations or from a cæcostomy, which simply acts as a safety-valve. Stone takes a much more radical view. He thinks that ileostomy is the operation of choice, bringing up a loop and cutting it off so as absolutely to guarantee against any faecal contamination of the whole colon.

[The reviewer has had considerable experience in this disease lately, and is heartily in accord with this view. The stoma should be made even a few feet above the ileocaecal valve if the last loop of the ileum is also ulcerated. He knows of at least one case where ileosigmoidostomy resulted in an enormous

distention of an ulcerated colon, with overwhelming sepsis. Also the ulcers are often found in the lower sigmoid and upper rectum, thus rendering the operation an inefficient short-circuit, as well as making it very dangerous and difficult. Stone also does an appendicostomy for irrigating purposes. The reviewer has had very little success with irrigations, and as the patient is at once rendered perfectly comfortable and painless it seems unnecessary.

It is interesting to note that in the cases reported by Stone and by Krogius there is no mention of ever closing these artificial ani. This also accords with my own experience. One is almost compelled to admit that surgery in these cases is not curative but palliative. Of the six that have come under my observation all are practically well, have gained much in weight and strength, but all still have the stoma open. This is because there is a little watery mucus passed about once a day from the rectum, and this always contains a little blood and pus. Some ulcers are generally visible on proctoscopic examination. I believe we must face the fact that many of these ileostomies are permanent, and that all must be kept open for a very long time.—E. W. A.]

Preliminary Drainage in Colon Operations.—With the development of surgery of the large bowel it is rapidly being recognized on all sides that a preliminary drainage is necessary. Most colon operations are for obstruction of some sort. The bowel is therefore thick, diseased, and often under extreme tension. Shock and acute toxæmia are often present. Even in the quiescent cases post-operative distention is a common complication. The colon produces gas very rapidly and absorbs it rather slowly. If a resection of the colon is done, the œdema and exudate at the site of the suturing will often produce a temporary obstruction for a few days. Lockhart-Mummery³ is of the opinion that the first step in all such operations should be a cæcostomy. If the condition is at all acute, no exploration as to its cause is needed. A small incision is made under local anaesthesia into the cæcum and drainage established in this area. Prompt relief of all the symptoms ensues, and the cause of the trouble can be sought and dealt with at a later operation with the patient in much better condition. His technique is simple: to insert a tube into the distended bowel and invaginate it by two rows of sutures; and he says that he has never seen such a stoma fail to heal in a few days after removal of the tube. Rowlands⁴ also believes that in severe cases cæcostomy affords the easiest and quickest relief. However, he thinks that exploration and finding the site of obstruction can safely be done first. In many cases he simply anastomoses around the obstruction at the first sitting, although he never undertakes a resection without preliminary drainage, saying that the mortality from such a procedure is over 90 per cent, surely an exaggeration. Hirschman⁵ thinks all such primary operations should be done under local anaesthesia. He also is in favour of exploration at the first operation in most cases. In all cases where resection is possible a temporary colostomy is made above the site. This is most quickly and easily accomplished by merely bringing out a loop of bowel and pushing a small rubber tube through its mesentery to hold it out. The skin and muscle are then closed about it. If drainage is urgent, this loop may be opened at once, but in most cases the condition of the patient will tolerate a longer or shorter delay. This may or may not be a painful period for the patient. If pain is severe, the opening should be made early. The longer we can wait, the more chance there is of clean wound healing. Closure of such a wound is very simple. If the cut in the bowel is short, it may be sutured while the bowel is still outside the belly, and when the faecal contamination has been overcome by antiseptic dressing the loop can be returned to the abdomen. Judd and Rankin⁶ prefer an ileostomy in such cases as a safety-valve. They use a technique similar to that of a Witzel gastrostomy—that is, the oblique burying of a catheter into the bowel. They

also advise sewing the omentum about the site of drainage as a safeguard. Such a wound will generally heal in a very short time after the tube is removed, provided that the original obstruction has been overcome. Crile⁷,⁸ also strongly favours preliminary drainage in all operations upon the colon. A colostomy above the site of the obstruction is generally the procedure of choice, but if the growth is in the cæcum or ascending colon an ileosigmoidostomy is made instead. He believes that, when it comes to the removal of the growth, the incision should be made without regard to the structures of the abdominal wall, no routine being used, but cutting in any direction necessary to get adequate exposure. Since this principle has been adopted the mortality in his clinic has become much smaller, only 2 deaths occurring in the last 87 cases.

REFERENCES.—¹*Jour. Amer. Med. Assoc.* 1922, Nov. 11 (abstr.); ²*Ann. of Surg.* 1923, March; ³*Lancet*, 1922, Nov. 25; ⁴*Guy's Hosp. Rep.* 1923, Jan.; ⁵*Jour. Amer. Med. Assoc.* 1922, Sept. 23; ⁶*Surg. Gynecol. and Obst.* 1922, July; ⁷*Ohio State Med. Jour.* 1923, Jan.; ⁸*Pennsylvania Med. Jour.* 1922, Sept.

CONGENITAL CLUB-FOOT. (*See BONES AND JOINTS, SURGERY OF.*)

CONGENITAL DISLOCATION OF HIP. (*See HIP, CONGENITAL DISLOCATION OF.*)

CONGENITAL HYPERTROPHY OF THE PYLORUS. (*See PYLORUS.*)

CONGENITAL MALFORMATIONS OF RECTUM. (*See RECTUM.*)

CONGENITAL SYPHILIS. (*See SYPHILIS, CONGENITAL.*)

CONJUNCTIVITIS. (*See EYE AFFECTIONS, GENERAL.*)

CRANIAL SURGERY. (*See also BRAIN, TUMOURS OF.*)

J. Ramsay Hunt, M.D.

Cranial and Intracranial Trauma.—C. H. Frazier¹ discusses the management of cranial and intracranial trauma. The mortality, high as it now is, has been reduced by the elimination, to a large extent, of meningitis as a complication. The proper treatment of the scalp wound in compound fracture of the vault, and the hygiene of the nasopharynx and the external auditory meatus in basal fractures, has reduced measurably the incidence of meningitis. Urotropine is always prescribed; but if it be true that the drug is effective only in an acid medium, it must be inert in the cerebrospinal fluid.

Putting aside the question of infection, there remain two factors which are responsible for the majority of fatal cases: hæmorrhage from the middle meningeal artery, and cerebral contusion.

Cerebral contusion and laceration, with or without basal fracture, present the most difficult problem from the standpoint of treatment, and they are the most frequent cause of the fatalities of intracranial trauma. The outstanding feature in the pathology of contusion and laceration is the cerebral oedema more or less widely diffused according to the violence of the injury, and the concomitant increase in intracranial pressure. Because of the latter, and since the introduction of the operation of subtemporal decompression, resort to this operation, more or less indiscriminately, has become an all too prevailing practice. This statement invites the question, how shall one discriminate?

A cerebral trauma so grave that without intervention death follows within the first six, twelve, eighteen, or even twenty-four hours, will not be influenced by a subtemporal decompression. In these cases there may be a grave cerebral anæmia due to the rapid increase in intracranial pressure, but the desperate

PLATE XII.

FRACTURE OF THE SKULL



Fig. A.—Radiograph taken on admission, showing fracture in frontal region. Arrow points to point of fracture into and through the frontal sinus.

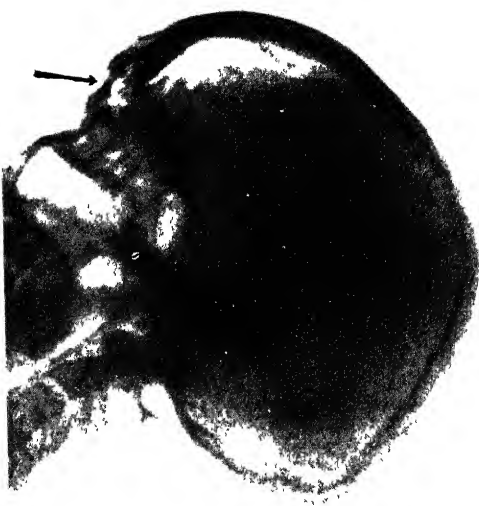


Fig. B.—Radiograph taken two days after that shown in *Fig. A*, showing air still present but in depressed position. Arrow points to line of fracture.

Figs. A, B, C by kind permission of 'Surgery, Gynecology, and Obstetrics'

PLATE XIII.

FRACTURE OF THE SKULL—*continued*



Fig C.—Radiograph taken two weeks after operation, showing absence of air in frontal region under bone flap.

FRACTURE OF SKULL IN NEW BORN

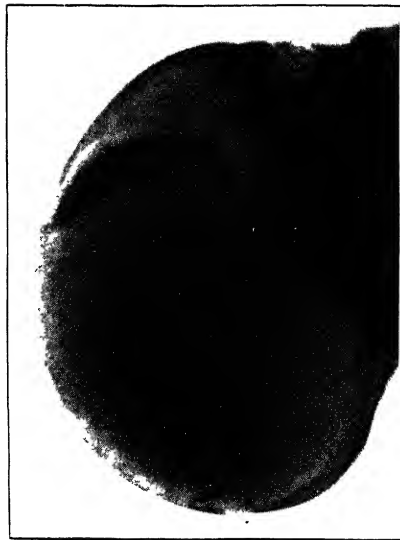


Fig D.—Radiograph appearance of skull, showing fissure and broken fragment of frontal bone.

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situation is created by a lesion within the medulla itself. It may be an extension of the rapidly diffusing œdema, or an actual intramedullary contusion or hæmorrhage, gross or microscopic. Hence the futility of the operation under these circumstances. May we not assume, too, without argument, that a subtemporal decompression is without justification in cases of so moderate a degree of trauma that the recovery of the patient is at no time in serious doubt. It has been claimed that subtemporal decompression in these cases assures a more prompt recovery from the immediate effects, and reduces the incidence of the late effects, of intracranial trauma. This is, however, a mere assumption; there is as yet no substantial evidence in support of it.

Having eliminated the very grave and the milder cases, there remains an intermediate class, and it is in this class that the operation in question may be performed with propriety. The decision must be made usually in the second twenty-four hours after the injury, not before and seldom later, and the decision must be based upon evidence of increasing pressure. We hear too much about the increase of intracranial pressure as measured by the lumbar puncture manometer, about increase in blood-pressure, about papilloedema, as indications for operative intervention. The blood-pressure and papilloedema are not infallible signs. The evidence should include a complete survey of the cerebral functions disturbed: stupor or unconsciousness, muscular relaxation, reflex disturbance, Cheyne-Stokes phenomena; and only as supplementary evidence the blood-pressure, papilloedema, etc. As the cerebral anæmia becomes more intense, the disturbance of cerebral function becomes more pronounced, and one soon learns to evaluate the degree of cerebral anæmia in terms of disturbed function. As a matter of fact, subtemporal decompression is most effective in those cases in which there is an excess of cerebrospinal fluid in the subarachnoid and subdural space; and the opening of the dura releases the tension by allowing the escape of fluid. Per contra, the operation is least effective when there is no free fluid and the herniated brain engages snugly in the dural opening.

Intracranial Aerocele following a Fracture of the Skull.—Grant² reviews the cases of intracranial aerocele for the past few years. The air is always intradural. In none of the 10 cases embodied in this report was the presence of the intracranial air suspected until shown by a röntgenogram. In all cases of compound comminuted fracture of the skull, especially of the frontal areas of the skull which may involve the basal sinuses, the possibility of an intracranial aerocele should always be considered. Even in the absence of an apparent skin laceration the fracture may be compound internally into the sinuses, with a tear in the dura through which the air may be forced. If the air is not seen in the first X-ray picture, the röntgenogram should be repeated subsequently at intervals a month or more apart, particularly if signs of increased intracranial tension develop. The presence of a pneumocranium immediately after the injury is an indication for operation at once to attempt to close the dural tear, thus minimizing the danger of infection (*Plates XII, XIII, A, B, C*). If the air is unexpectedly discovered after five or six days, when the sinus may have spontaneously closed, and if on repeated X-ray examination the quantity of air shows no increase and is causing no symptoms, a policy of watchful waiting should be instituted. Air *per se*, once the possibility of infection can be excluded, is relatively innocuous; it will be absorbed and no harm result. The patient should be warned against coughing or sneezing, which might reopen the sinus and force more air into the subdural spaces. Urotropine should be administered. The nose should be douched gently with a weak antiseptic solution.

Sir William Wheeler³ also reports on traumatic intracranial aerocele, and

thinks it questionable whether treatment along conservative lines would not be followed by better results.

Intracranial Hæmorrhage in the Newborn, and Fracture of the Skull of the Infant.—C. Ballance and Sir Charles A. Ballance¹ report the details of a case of intracranial hæmorrhage in the newborn as a preface to some general observations on fracture of the skull of the infant (*Plate XIII, D*).

Cranial palsies, epilepsy, and other nervous disorders which may be a permanent life disablement may ensue from the untreated hæmorrhages arising from trauma during birth. The unsupported venules passing to the longitudinal sinus and Pacchionian bodies are easily broken, and thus large extravasations may occur in the subdural space, while the giving way of the thin-walled vessels on the outer surface of the dura may occasion extradural hæmorrhage. The extravasations are usually unilateral. These hæmorrhages give rise to post-natal asphyxiation, a bulging fontanelle without pulsation, convulsions, contralateral palsy, a stable pupil, ocular proptosis, subconjunctival hæmorrhage and œdema on the side of the hæmorrhage, irregular respiration, slowing of the pulse, rise of temperature, inability to take nourishment, and death.

In the foetal skull the sutures are absent; the adjacent margins of the bones of the skull are separated by fibrous septa continuous with the dura mater internally and the pericranium externally; hence it is difficult to separate the flat bones of the vault from the underlying dura mater, each bone being lodged as it were in a dense membranous sac. The bones of the vault consist of a single layer without any diploë. The effect of an injury to the cranial vault of an infant is as a rule limited to one bone, and this is naturally the result of the anatomical conditions of the cranium present at this period of life.

As the consequence of *direct injury during early infant life*, fractures occur similar to those that happen sometimes during delivery. Indeed, such fractures, without fissures radiating in many directions, are to be expected until the time comes when the bones of the cranium are united by sutures and not simply joined together by fibrous tissue, and when they are no longer thin lamellæ without diploic tissue separating an inner and outer table.

The facts in regard to the infant's skull after birth were pointed out very clearly by Sir Rickman Godlee. Godlee writes: "When a young child receives a blow on the head, the mischief is almost all spent upon the part struck and that lying immediately beneath it. The process extends little if at all beyond a single bone; indeed, no one of the common fractures of the skull as we meet with them in the adult can take place in its typical form in an infant; but, on the other hand, there are forms of fractures special to the young skull. There are fractures of the infant's skull which would have been undetected (the bone after breaking the adjacent dura and severely lacerating the brain having sprung back in place) had not actual brain matter been found in the wound beneath the scalp or in the pus evacuated from the suppurating hæmatoma which formed over it."

Clement Lucas, from the study of these and other cases, drew two conclusions: (1) That cases of simple fracture of the skull followed by collections of cerebrospinal fluid beneath the scalp are peculiar to young children; and (2) That when cerebrospinal fluid escapes through the vault (whether the fracture be simple or compound) the injury has extended to the ventricular cavity.

It will be seen from the above that pioneer papers illuminating fractures of the infant's skull after birth were contributed by Lucas and Godlee, while the same is true of Cushing concerning the fractures of the skull in the newborn. At both periods of life the fractures tend to be of the same type, and so the surgical treatment suitable for the one is also proper for the other.

Clement Lucas was especially interested in the escape of cerebrospinal fluid in the fractures of the vault, and came to the conclusion, as stated above, that when cerebrospinal fluid escapes through the vault the injury has extended to the ventricular cavity. But we now know that cerebrospinal fluid may escape from the subarachnoid spaces of the cortical meninges of the cerebrum and cerebellum in considerable quantity without there being any direct communication with the ventricles. Harvey Cushing urges justly that operation should be undertaken promptly, not only to obviate impending death, but also, in cases of the recovery of the infant, to anticipate and prevent the common sequelæ of such injuries—paralyses, amentia, epilepsy, etc.—which cause the child to become a burden to its parents and a useless member of the community.

Lastly, it may be affirmed from the authors' experience that infants bear operations on the skull well, when carried out with the greatest gentleness and with every effort to prevent loss of blood.

Intracranial Pressure.—Temple Fay⁵ describes the administration of *hypertonic salt solutions* for the relief of intracranial pressure. Weed and McKibbin were the first to show the value of hypertonic **Sodium Chloride** solutions by vein, and sodium sulphate and sodium chloride by rectum and bowel, for the reduction of intracranial pressure. Foley and Putnam confirmed this work, and a clinical application was made of these findings by Haden, Cushing and Foley, and Sachs. In a more recent article, Downman describes the use of **Magnesium Sulphate** in cases of intracranial tension, with marked success. The use of magnesium sulphate to assist in controlling intracranial tension was first adopted a little more than two years ago as a means of reducing intracranial pressure and volume, following the author's observation that infants showed a marked retraction of the fontanelles after its use, because of the dehydration that it produces throughout the cerebral system. At the time a method brought forward by Cushing and Foley of the intravenous injection of 35 per cent sodium chloride solution was in use, but since that time this method has been replaced in the majority of cases by the easier and more satisfactory administration of magnesium sulphate solution, either by rectum or by mouth. The intravenous method of sodium chloride administration is still found to be of great value in cases in which rapid reduction of intracranial pressure and volume is necessary on the operating table.

Magnesium sulphate has been found of decided value in the pre-operative study of cases presenting intracranial pressure. The patients have been relieved of headache, vomiting, choked disk, medullary depression, and coma. Their symptoms and responses could be more carefully observed when the intracranial tension was relieved, and they could be kept in comfort for several days before operation. The use of magnesium sulphate as a routine measure before operation in cases of suspected intracranial tension has permitted exposure of the cortex, otherwise unsafe in the presence of decided pressure.

In the post-operative treatment of the so-called medullary oedema, magnesium sulphate had been found indispensable.

In cases of injuries to the brain in which fracture of the skull or concussion is associated with marked stupor, respiratory and cardiac depression due to intracranial pressure, and 'medullary oedema', dehydration by magnesium sulphate is followed by marked relief of these symptoms.

As regards *mode of administration*, magnesium sulphate is best given by rectum. The author has found 3 oz. (90 grm.) of the crystals dissolved in 6 oz. (175 c.c.) of warm water, introduced by means of a soft rubber catheter and syringe, the most effective and the simplest method. The effects become apparent in about an hour. The patient is saved the distress of active

catharsis; moreover, in cases of vomiting, the administration of the salt by mouth may increase emesis, and the value of the drug will then be lost to the patient. When given by mouth, $1\frac{1}{2}$ oz. (45 gm.) of the crystals in 8 oz. (235 c.c.) of water bring relief a little sooner, but this method is not without its disadvantages from the standpoint of the patient. This dose may be repeated every fourth hour until the desired dehydration is obtained. When given by rectum, no discomfort has been noted, and the accumulated fluid is siphoned off from time to time. If more than 6 oz. of fluid is used, the patient may expel the solution, owing to its volume. In cases in which the patient is irritable, a drachm (4 c.c.) of camphorated tincture of opium added to the salt solution may be of great benefit in assisting him to retain it. Fluid intake should, of course, be restricted to a minimum.

No ill effects from its repeated use have been noted by the writer. A wider application of his method for the administration of magnesium sulphate has been noted by other services of his hospital, and the results so far reported have been very satisfactory. It was found of value in the papilloedema of encephalitis, in glaucoma, in cedema of the glottis, and in cedema of the lungs.

REFERENCES.—¹*Surg. Gynecol. and Obst.* 1923, Jan., 111; ²*Ibid.* Feb., 251; ³*Lancet*, 1923, i, 529; ⁴*Ibid.* 1922, ii, 1109; ⁵*Jour. Amer. Med. Assoc.* 1923, May 19, 1445.

DEMENTIA PARALYTICA. (See GENERAL PARESIS; NEUROSYPHILIS, PARALYTIC DEMENTIA, AND TABES.)

DEMENTIA PRÆCOX.

C. Stanford Read, M.D.

Hereditary disposition in dementia præcox has been investigated by Wimmer,¹ who stresses the valuelessness of older statistics. He concludes that this mental affection is probably of an hereditary nature: in Mendelian terms, recessive and di-hybrid; the heredity is similar and discontinuous; with parents apparently normal it appears in approximately one-sixteenth of their offspring. As a practical observation, the presence of the disease in a family excludes the occurrence of the manic-depressive psychosis. Canavan² studied the mental health of 463 children from dementia præcox stock. From the investigation of 1000 discharged dementia præcox patients he thus summarizes: 925 were of marriageable age; of these only 275 were married, from whom issued 463 living children, of whom 381 were finally studied; of these, 86 deviated from the normal, either mentally, physically, or socially; of the 86 deviators, the mother had been the patient in 74 cases, the father in 12. The deviators consisted of 5 dementia præcox patients, 4 feeble-minded, 12 backward, 12 nervous, 17 physically diseased, and 36 cases of conduct disorder.

PATHOLOGY.—The main interest centres around the doubtful pathology of dementia præcox, and much work has been done with a view to throwing added light upon it. Raphael³ from his physiological researches concludes that there consistently occurs a definite hypo-oxidative status with general metabolic depression and associated with vegetative features, most marked in the acute, unadjusted, or exacerbative phases. These are frequently superimposed upon a structure initially vulnerable. He, however, does not specify an organic basis for dementia præcox, but brings forward data which may help in a broader correlation. Twenty-five cases of schizophrenia were subjected to the fullest investigation from the clinical, chemical-metabolic, and psychologic-analytical standpoints by Hall and Neymann.⁴ They found that 12 cases fell into a group which showed evidences of toxæmia, 7 into a group showing evidences of endocrine disturbances, and 5 showing psychogenic disturbances on analysis. One case could not be classified. A series of biochemical studies of 10 cases of dementia præcox were made by Bowman, Edison, and Burladge,⁵

PLATE XIV.

ADRENAL MEDULLA IN DEMENTIA PRÆCOX



Fig. A.



Fig. B.



Fig. C.



Fig. D.

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from which they obtained no constant findings which would serve to explain the disease on the basis of a simple dysfunction of a single gland. There was found a tendency towards a low basal metabolism and an abnormally sustained blood-sugar curve, but such findings were not constant. Dawson⁶ has studied the endocrine-autonomic disorders of dementia præcox, and states that the chief physical manifestations appear to be due mainly to disorders of the vegetative nervous system. He finds a high proportion of vagotonics, amongst whom many displayed evidence of adrenal inadequacy, and suggests that the vagotonia is relative rather than absolute, and is due to sympathetic-adrenal hypofunction.

Mott's pathological work, more especially in relation to testicular abnormalities, is well known and has been dealt with in previous numbers of the MEDICAL ANNUAL. In conjunction with Such he has dealt with his findings at some length.⁷ With Hutton, Mott⁸ has published further research work on the normal and morbid conditions of the adrenals in 100 hospital and asylum

DESCRIPTION OF PLATE XIV.

Fig. A.—Drawing of a section of the medullary portion of the adrenal gland; stained Del Rio Hortega method. A case of dementia præcox who was for two years in a mental hospital, where he died of pneumonia at the age of 25 years. Note the fibrous groundwork, which tends to be pericellular and somewhat coarse. The cells show scanty cytoplasm, and some of the nuclei have no surrounding cell body. The nuclei are irregular in shape and show great variation in size and in intensity of staining. ($\times 800$)

Fig. B.—Photomicrograph of a section of the medullary portion of the adrenal gland of a case of dementia præcox who was for eighteen months in a mental hospital, where he died of pneumonia following influenza at the age of 21 years. The cells in this case vary much. In parts, as at the top of the photograph, can be seen cells which approach the normal in appearance. Throughout the specimen small cells are seen, the cytoplasm shows vacuolation, and the nuclei show variation in size. ($\times 450$)

Fig. C.—Photomicrograph of a section of the medullary portion of the adrenal gland of a case of dementia præcox who was for sixteen years in a mental hospital, where she died, age 33 years. Note that the fibrous background is slightly thickened, that the cells are small, and that the nuclei are surrounded in some cases by a very small amount of cytoplasm, and in some cases none is present. The nuclei vary in size and in staining. ($\times 450$)

Fig. D.—Photomicrograph of a section of the medullary portion of the adrenal gland of a case of dementia præcox who was for two years in a mental hospital, where she died, age 29 years, of tuberculosis. Note the coarse fibrosis and the cells, which are atrophied. Some of the nuclei have no surrounding cytoplasm. The nuclei show variation in size. ($\times 450$)

cases. They find that the most constant change which is found in the medulla adrenalis in dementia præcox is the increased number of nuclei, irregularity of their size and form, and deficiency of chromatin. There is also an increase of fibrous tissue, which often takes a pericellular arrangement, and an increase of fibroblastic nuclei (*Plate XIV*).

Gibbs,⁹ in an examination of 325 unselected male patients suffering from dementia præcox, found frequent outward testicular abnormalities, and of those admitted between the ages of 16 and 20, 13 per cent showed a feminine type of pubic hair, while between 21 and 40 years of age only 2.6 per cent showed this, indicating that its greater frequency in patients with an early onset is something more than a retarded phase of normal male sex development. Adult sexual relations with the opposite sex had never been accomplished by 64.1 per cent of those who could give a reliable account of themselves.

Important work on the pathological anatomy of the ductless glands in a series of dementia præcox cases has been carried out by Morse¹⁰ at the Psychopathic Hospital, Boston, the results mainly being quite contrary to the findings

of Mott upon which the latter bases his theory of a primary regressive atrophy of the gonads in dementia præcox. The trend of the work, too, has been rather against any close connection between endocrine disorders and dementia præcox. Morse points out that even if the endocrine glands are found to be abnormal, as they frequently are, it does not prove there is any connection between the endocrine lesion and the mental disease. The gonads and other ductless glands of a dementia præcox patient may be markedly atrophic owing to causes quite apart from the psychosis. Frequently, too, it is impossible to say whether or not a given histological picture is normal. This observer raises the objections that there has previously been no allowance made for factors other than the mental disease, and that the cases have been insufficiently controlled. Morse has been careful to avoid both these factors. In 27 cases under forty-five years of age (12 male and 15 female), the gonads, pituitary, thyroid, and adrenals were studied, and the findings were viewed in connection with the history of the patient, the duration of the mental disease, the degree of mental deterioration, the nature of the terminal disease, the state of the nutrition, and any data given in the history of the sex life; also any indications in the physical examination of anomalies that might be due to endocrine disturbances. In regard to the gonads, the results were that 16 patients had active glands, but in tuberculous cases and those who were emaciated at the time of death the glands were inactive. There was no correlation between atrophy of the sex glands and the duration of the mental disease or the degree of psychic deterioration. The condition in the sex glands in the controls was essentially the same as in the dementia præcox cases for the same terminal diseases, with the exception of the feeble-minded, the infantile, and the emaciated cases. Morse therefore plainly demonstrates that *from the pathological side there is very little evidence of a primary atrophy of the gonads in dementia præcox*. There is no one uniform condition of the gonads or other endocrines in dementia præcox dependent on the disease process, and the main factors which determine the condition of the gland at autopsy are the nature and duration of the terminal disease, the state of the nutrition, and possibly in some instances some other underlying defect.

PROGNOSIS.—One of the most important and valuable contributions to psychiatry is given by Henderson,¹¹ who deals with the prognosis in adolescent psychoses. In a way which demonstrates his excellent grasp of mental problems he shows how at adolescence adjustments and adaptations are most easily effected. Since, as he states, prognosis must depend upon the views held regarding the mechanisms provocative of the mental disorder, it is essential that a broad psychobiological standpoint should be entertained; so that Cotton's work must be looked upon with much reservation because of the narrow conception it involves. The formulations of Adolf Meyer, Hoch, and Amsden, and their co-workers in recognizing reaction types more than diseased entities are a great advance. The dementia præcox type of reaction is unsatisfactory, but has not necessarily an altogether bad prognosis. At the period of adolescence we should not study the psychosis merely in terms of manic-depressive insanity or dementia præcox, but as individual reaction types, and Henderson briefly gives us illustrative histories of præcox reactions which became socially recovered. Prognosis depends upon elucidating the etiological factors, on building up the personality, and on the constitutional adaptability of the individual. It is pointed out that there were many præcox reactions found in the late war psychoses which frequently bettered, this being probably due to the psychosis occurring at a more superficial level and to early detection. Prognosis, too, depends largely upon whether one can or cannot demonstrate constitutional anomalies during the period of development.

If well marked, the prognosis is graver than where exogenous factors were more responsible. Occupational activities are important, and there may often be a social recovery if not a scientific cure. It is therefore not merely a question of eradicating focal infections, establishing endocrine balance, or of analysing the psychogenesis, but an open mind must be kept to all these and an estimate made of how one has dovetailed into the other. Prognosis will depend on the intensity and individuality of treatment, and the earlier the better.

REFERENCES.—¹*L'Encéphale*, 1922, xvii, 129; ²*Mental Hygiene*, 1923, vii, 137; ³*Amer. Jour. Psychiat.* 1923, iv, 515; ⁴*Jour. of Nerv. and Ment. Dis.* 1922, lvi, 433; ⁵*Boston Med. and Surg. Jour.* 1922, Sept.; ⁶*Jour. of Ment. Sci.* 1923, lxix, 182; ⁷*N. Y. Med. Jour.* 1922, Sept. 20 and 27; ⁸*Brit. Med. Jour.* 1923, July 21; ⁹*Arch. of Neurol. and Psychiat.* 1923, Jan.; ¹⁰*Jour. of Neurol. and Psychopathol.* 1923, iv, 1; ¹¹Paper read at Annual Meeting of British Medical Association, 1923, July.

DENGUE.

Sir Leonard Rogers, M.D., F.R.C.P., F.R.S.

L. C. Scott¹ gives a full account of a dengue outbreak in Louisiana in the autumn of 1922, based on the answers to a questionnaire from 442 physicians, relating to close on 30,000 cases, which brings out the following points. The incubation varied between 3 and 7 days and averaged 5: onset sudden with the initial symptoms of headache, fever, and pains in 86 per cent; the pulse was increased conformably with the temperature in 44.7 per cent, and was slower than normal in 25.5 per cent; muscle pains alone, muscle and joint, or joint pains alone were met with in that order of frequency, the first being most frequent; early conjunctival injection was noted in 71 per cent; gastrointestinal symptoms of sickness or diarrhoea in about 45 per cent, being exceptionally high in this outbreak, different epidemics tending to show variations in different symptoms: remissions of temperature were noted in 76 per cent from a few hours to a day or more, most frequently on the third or fourth day of fever: the eruption was noted in 61.8 per cent, being of great diagnostic importance, and was usually morbilliform, scarlatiniform, or resembling that of German measles: icterus was noted in 28 per cent, 'black vomit' in an average of .6 per cent; the duration varied between 4 and 8 days, averaging 6 days; prolonged convalescence or depression was noted in 85 per cent; leucopenia was well marked, and the mortality directly due to dengue was nil, all deaths being due to the addition of other diseases. The prevalence of the disease was associated with abundant *Stegomyia fasciata* (now called *Aedes ægypti*), and the principal cause of the decline of the epidemic in December was the sudden change to colder weather checking mosquito breeding, and to screening houses and protecting patients by mosquito netting.

L. Rice² also deals with the same epidemic on similar lines. No specific treatment is known.

Seven-day Fever.—C. J. Stocker³ writes on the bacteriology of this fever as seen in an Indian regiment in Rangoon. The outbreak commenced during a voyage from Bombay, culicine mosquitoes being found on the vessel, which carried a consignment of fruit. The fever showed the usual characters of dengue, including onset, temperature curve, pains, and rash, and late eosinophil increase. Blood cultures were made in 27 cases, and in 6 a bacillus of the coli group was isolated, which showed the characters of that previously described in this fever by Rogers, although Stocker was not aware of his work until later; agglutination was obtained with the blood of 6 patients out of 17 tested, the negative cases being all on the first day of the disease. Sensitized vaccines made from the bacillus were used, the cultures being kept in contact for twenty-four hours with a serum obtained from a goat subjected to injections with increasing doses of the bacillus, three patients treated with full doses being definitely of the opinion that it was beneficial. The work,

however, was stopped at this point by transfer to war service, but not before the same bacillus had been recovered from cultures of the blood from the stomachs of 9 of 24 *Culex fatigans* caught in the mosquito nets of patients after gorging on their blood; the organism gave the same cultural reactions as that of Rogers, so he regards it as the cause of the disease.

REFERENCES.—¹*Jour. Amer. Med. Assoc.* 1923, Feb. 10, 387; ²*Amer. Jour. Trop. Med.* 1923, March, 73; ³*Ind. Med. Gaz.* 1923, March, 97.

DENTAL CYSTS. (See NOSE, AFFECTIONS OF.)

DERMATITIS, OCCUPATIONAL.

E. Graham Little, M.D., F.R.C.P.

O'Donovan,¹ opening a discussion on this subject, said that friction is a frequent source of hyperkeratosis and cancer, a particularly curious instance being a carcinoma derived from the rubbing of a wedding ring. Ordinary dirt is uncommonly a cause of dermatitis, but contact with water for any length of time is notably often a cause, especially if any acid or alkali is added to it. Stronger chemical solutions, e.g., naphtha and phosphorus, are particularly likely to give rise to resistant dermatitis. Persons who handle foodstuffs suffer from various forms of dermatitis, such as the parasitic itch of workers in imported barley and figs, the plant dermatitis of pea pickers, etc. Contact with preservatives and antiseptics is an important factor, and formalin has a specially mischievous effect. Oil dermatitis is a complicated subject; the effect may be produced by the oil itself, by additions to it—e.g., of alkali in cutting oils—and by the presence of particles of metal with the oil. The dirty habits of the workers, who usually refuse to use means of cleanliness when provided, play an essential part in the production of these eruptions. Tar is so important and well recognized a factor in the production of cancer that a special chapter is devoted to this causation. It is rather surprising to read of the long exposures to the irritant common to the histories, and the very long periods which may intervene between the cessation of contacts and the developments of cancer. The author states his conviction that the epitheliomata derived from tar are of very low malignancy, and peculiarly amenable to treatment by radium. Workers in dyes, especially in the fur trade, are very subject to dermatitis.

The writer advocates the general principle that workers who display a special vulnerability should be promptly discarded from the industry, and thus a number of workers with an established immunity may be collected, to the great benefit of the industry.

Lane,² examining statistics at the Massachusetts General Hospital, claims that 11.5 per cent of the cases admitted as dermatitis or dermatitis venenata, and about 4.4 per cent of the cases admitted as eczema, were probably industrial in origin. The ratio of industrial cases to the total admissions to the skin clinic was given as from 2.3 to 3.1 per cent; but he thinks that this is an under-estimate, and would say that from 4 to 5 per cent of cases admitted would be found to be due to occupational factors. Over 60 per cent of these cases were male. He urges the importance of prevention rather than cure by careful consideration of the actual circumstances in each case. It is often possible by changing the working conditions, without changing the man to another job, to avoid the recurrence of the injury.

Bakers' Itch.—De Jong³ has investigated the conditions under which bakers work, more especially the ingredients they use. Flour, he thinks, can be excluded as a cause. Yeast does not apparently produce any disturbance in other occupations—for example, in brewers. Patients with this disorder were found to be exclusively from bakeries where the dough was mixed by

hand, and the conclusion is reached that it is the salt (chloride of sodium), which forms a considerable proportion (about 3·6 per cent) of the baking mixture, which is the real irritant. Other workers with salt—herring curers and packers, for example—frequently have a similar dermatitis. An important corollary of this finding is that the worker is entitled to compensation by the terms of the Act. For prophylaxis the workers should be encouraged to rinse their arms from time to time under running fresh water, especially during the kneading and baking processes.

Interdigital Eruption due to Yeasts.—Mitchell⁴ describes three cases, all in women occupied with domestic washing, in only one of which he was able to make a complete examination. The lesions consisted of areas of shiny red skin in the clefts of the fingers, the areas being surrounded by a collarette of scales. No vesicles were noted at any time. In some places the epidermis was thin and macerated, showing fissures in cold weather. There was no spread of the lesions from these areas, nor were the feet at any time affected. Examination of small fragments of tissue removed from these parts showed the presence of yeast-like buds which could be grown on Sabouraud's proof medium as creamy white shiny colonies of yeast organisms. Treatment by application of various parasiticide ointments, tincture of iodine, salicylic acid powders, and radiotherapy, produced no effect as long as the patient continued her occupation. When this was discontinued, the condition improved.

Skin Eruption due to a Mould.—Russ⁵ reports an interesting epidemic occurring amongst persons sorting and packing various kinds of dried fruit, the infection being probably derived from the sacking which contained them. Papules appeared on the fourth day after contact. These became vesicular on the sixth day and pustular on the eighth. Only the palms and forearms were affected. Smear preparations appeared negative, but after fourteen days' culture a typical mycelial growth was obtained, pronounced by Professor Massee to be a *cereosporella*. The writer was able to produce the lesions on his own arm by inoculating with the fungus.

Dermatitis due to Lacquer.—Pusey⁶ reports a case of acute papulo-vesicular eruption in a man, age 32, a pedlar of lacquered canes. An alcoholic solution of the varnish from the cane applied to a healthy skin produced within four minutes a large inflammatory wheal; a control tested with the same alcohol used for the solution but without the varnish produced no effect. Lacquer is made from a Japanese plant (*Rhus vernicefera*), and it is well recognized as a cause of dermatitis. The attacks yielded rapidly to wet dressings of aluminium acetate solution.

Dermatitis due to Procain.—Gaskill⁷ explains the fact that dentists especially suffer from dermatitis from the use of procain, by a reference to the long hours which dentists have to work continuously as compared with physicians and surgeons, in whom procain dermatitis is much less frequent. The eruption follows two types: (1) Papulo-vesicular lesions on an erythematous base accompanied by intense itching; and (2) A warty condition of the ends of the fingers, with involvement of the nail bed and hypertrophy of the nail itself. When fissures are present, pain is severe. Overwork and worry, irregular meals, working when tired, all seem to accentuate the susceptibility. The author suggests as a prophylactic the use of the following ointment: 25 per cent hydrous wool fat, 75 per cent vaseline; 2 per cent of phenol is added. A small quantity of this is to be rubbed thoroughly all over the hands before the procain injection is made.

REFERENCES.—¹*Brit. Med. Jour.* 1922, ii, 499; ²*Arch. of Dermatol. and Syph.* 1922, Nov., 565; ³*Lancet*, 1923, i, 894; ⁴*Arch. of Dermatol. and Syph.* 1922, Dec., 675; ⁵*Lancet*, 1923, i, 77; ⁶*Arch. of Dermatol. and Syph.* 1923, Jan., 91; ⁷*Ibid.* 1922, Nov., 576.

DIABETES MELLITUS. (*See also* INSULIN.)

John D. Comrie, M.D., F.R.C.P.E.

Most of the interest in this subject at the present time is focused on the question of treatment, especially that by insulin, and its relation to dietetic considerations. Reference to some theoretical considerations affecting insulin will be found under that heading.

CAUSES AND SYMPTOMS.—The causal relation existing in the majority of cases of glycosuria between the disturbed state of metabolism and a defect in the internal secretion of the pancreas is now generally recognized. The disturbance is known to include not only carbohydrate substances but proteins and fats, and it is associated with an increase of the sugar in the blood above the normal level of 0.1 per cent. The rise of blood-sugar that takes place normally after a meal is both accelerated and prolonged in diabetes, leading to the loss of a specially large amount of sugar in the urine when food is taken, particularly if that food is rich in carbohydrates. There are, however, other cases associated with the presence of sugar in the urine but without the metabolic defect, and an important group of these is included under the term 'renal diabetes'. In renal diabetes the blood-sugar is not unduly raised; in fact is frequently less than normal; and the loss of sugar in the urine does not increase, particularly after a carbohydrate diet. Schneiderman¹ records one of these cases that had lasted for six years in which the loss of sugar by the urine could be stopped temporarily by vigorous exercise, cold weather, oxygen, or atropine administration. Their importance at the present time consists in the danger that ensues if they are treated with insulin.

The epidemiology of diabetes, investigated by Hoffmann² for the Prudential Insurance Company, shows wide variations in different parts of the world, from 38.4 deaths per 100,000 of population in the Island of Malta to 16.4 in the United States and 11.8 in England and Wales. Hoogslag,³ analysing 250 cases of diabetes in Holland, found consanguineous marriages in 215, and in 43 per cent there was a previous history of diabetes in the family. Root and Miles⁴ found that obesity is closely related to the onset of diabetes, and that on the average diabetics have been 20 per cent over normal average weight prior to the onset of the disease, even if they lose weight rapidly afterwards. Wishart⁵ found that lipæmia may be regarded as among the most stubborn symptoms of severe diabetes, persisting after high blood-sugar and acidosis, even on diets low in fat and in total calories; and Allen⁶ concludes, on experimental grounds, that severe cases of glycosuria abolished by diet never show lipæmia however high the fat intake may be, diabetic lipæmia evidently representing some secondary breakdown in fat metabolism. Winter and Smith⁷ claim to have discovered that the normal blood-sugar of man and animals is not the same as ordinary fruit-sugar, having a lower rotatory power, while the blood-sugar of diabetics is identical with fruit-sugar, and their blood also contains a more complex sugar, which disappears when brought in contact with insulin.

Harrison and Lawrence⁸ have made a series of researches to determine whether the amount of external pancreatic ferment (diastase) present in the blood and urine is more or less accidental, or whether there is some definite variation connected with diabetes: they conclude, however, that its amount has no bearing on the diagnosis, prognosis, or treatment of diabetes. Major⁹ has carried out a series of studies upon sugar tolerance in normal and diseased subjects; he finds that in the healthy person the blood-sugar does not fluctuate widely after ingestion of glucose, the lowest figure obtained when fasting being 0.07 per cent, and the highest after sugar intake being 0.15; the chief characteristic of the diabetic curve was a high rise followed by a prolonged 'plateau'. Gray¹⁰ has carried out similar observations to determine a set of standards

for blood-sugars. He found that in clinically normal persons the fasting figure was on the average 0.09 per cent, but it might be as high as 0.16 per cent; after a test meal of glucose it usually attained a maximum of 0.16 per cent in half an hour, but in some cases—suspicious of a tendency to diabetes—it was found as high as 0.28 per cent one hour later. In diabetes the fasting figure might be only 0.11 per cent, but even when the fasting blood-sugar was normal there was a great rise after the test-meal, sometimes as high as to 0.5 per cent. He indicates from this the importance, in examining blood-sugar for diagnosis of diabetes, to do so after a test-meal. Thalheimer and Perry¹¹ have discovered that the blood in diabetes shows a diminished power of glycolysis when tested 'in vitro'; they suggest that the degree of this loss might be utilized as an index for the severity of cases of diabetes. John¹² has made an investigation as to the distribution of the blood-sugar between plasma and corpuscles, and he finds that in diabetics the sugar in the corpuscles is practically always less than that in the plasma.

TREATMENT.

Dietetic Treatment.—The importance of suitable dietetic measures is not lessened by the introduction of insulin, but rather increased. Generally speaking a diabetic patient should be treated in the first place by reducing or rearranging his diet. Only after it is found that he cannot be maintained on a level of diet necessary for the preservation of body weight or for carrying on his work should insulin be administered. Thereafter the regulation of the diet, though on a higher level, is just as necessary as before. Various forms of diet and methods of calculation were described in the MEDICAL ANNUAL for 1923, pp. 139, 140; the following diet scheme is one which the writer has used for some time, and is suited to an adult man of average body weight. The equivalents for constituent foods being given, it can be used readily to arrange the food when a diet containing so many calories is prescribed for a given patient. It should be noted that where 'vegetables 5%' is stated, any such vegetables as cabbage, cauliflower, Brussels sprouts, celery, French beans, leeks, lettuce, tomatoes, vegetable marrow, sea-kale are intended, so that the patient has a wide variety. Tea and coffee are interchangeable, and may be taken in greater quantity than is stated. Saccharin may be used as a sweetening agent, and generally speaking all condiments, except sugar, are admissible.

This diet contains a larger proportion of fat in accordance with the researches of Newburgh and Marsh than that given in the MEDICAL ANNUAL for 1920, p. 90. The groundlessness of the general fear of acidosis resulting from a diet rich in fat is discussed in the MEDICAL ANNUAL for 1922, p. 101, and a further elaborate research by these authors¹³ gives the satisfactory results obtained by them from a high-fat diet since 1918. Indeed, Marsh and Waller¹⁴ have shown that when diabetic lipæmia occurs, this is not due to fats taken in the food. Olmsted and Kahn¹⁵ have found by practical experience over a year and a half that at least two and a half times the weight of the total carbohydrates may be given in fat without risk of ketonuria. Graham¹⁶ carries the reduction of carbohydrates so far as to suggest that it is unwise to give any carbohydrate at all, except that in vegetables, until the fasting value of the blood-sugar has been below 0.12 per cent for a considerable time.

In the diet table the 2000 calories reached by the 23rd day are sufficient to carry on, for a prolonged period, a person of average weight doing sedentary work. Both for cheapness and for palatability it is well, after increased tolerance has been attained by a considerable period of restriction, to make the attempt cautiously of adding carbohydrates (e.g., bread), and later to replace a certain amount of the fat by these.

DIET TABLE IN DIABETES MELLITUS.

		Carbohydr gram.	Protein gram.	Fat gram.	Calories
Starvation day	7 a.m., tea 200 c.c. (7 oz.); <i>Breakfast</i> , coffee 200 c.c.; <i>Dinner</i> , bovril or clear meat soup 200 c.c.; <i>Tea</i> , tea 200 c.c.; <i>Supper</i> , bovril, etc., 200 c.c. =	0	6.6	0	27
1st day ..	7 a.m., tea 200 c.c.; <i>Breakfast</i> , coffee 200 c.c., boiled cabbage 75 grm. (2½ oz.); <i>Dinner</i> , coffee 200 c.c., boiled cabbage 100 grm. (3½ oz.); <i>Tea</i> , tea 200 c.c.; boiled cabbage 75 grm. (2½ oz.); <i>Supper</i> , bovril 200 c.c. (Note.—This gives a total of vegetables with 5% carbohydrate 250 grm.; tea 400 c.c.; coffee 400 c.c.; bovril 200 c.c.) =	8.5	9.2	0	72
2nd day ..	Vegetables (5%) 500 grm. (17½ oz.); tea 400 c.c.; coffee 400 c.c.; bovril 200 c.c. =	17.0	13.4	0	125
3rd day ..	Vegetables (5%) 720 grm. (25 oz.); eggs 3; cream 10 c.c. (2 teaspoonfuls); tea 400 c.c.; coffee 200 c.c.; bovril 200 c.c. =	24.7	35.4	19.5	428
4th day ..	Vegetables (5%) 620 grm. (21½ oz.); eggs 3; cream 20 c.c.; tea 400 c.c.; coffee 200 c.c.; bovril 200 c.c. =	21.5	33.9	21.0	422
5th day ..	Vegetables (5%) 620 grm.; eggs 3; cream 15 c.c.; meat 30 grm. (1 oz.); tea 600 c.c.; coffee 200 c.c.; bovril 240 c.c. =	21.4	42.5	25.2	497
6th day ..	As on 5th day, adding 15 grm. (½ oz.) oatcake =	28.9	50.0	26.0	565
7th day ..	Starvation day with fluids only	0	6.6	0	27
8th day ..	Vegetables (5%) 500 grm. (17½ oz.); eggs 3; meat 60 grm. (2 oz.); cream 60 c.c.; oatcake 15 grm., bacon 22.5 grm. (¾ oz.); tea 600 c.c.; coffee 200 c.c. =	27.0	56.3	52.0	825
9th day ..	Vegetables (5%) 500 grm. (17½ oz.); eggs 3; meat 60 grm. (2 oz.); bacon 30 grm. (1 oz.); butter 15 grm. (½ oz.); oatcake 22.5 grm. (¾ oz.); cream 60 c.c.; tea 600 c.c.; coffee 200 c.c.; bovril 200 c.c. =	30.2	55.4	67.4	957
10th day ..	As on 9th day, adding butter 30 grm. (1 oz.) and oatcake 7.5 grm. (¼ oz.) =	34.0	56.1	92.6	1233
11th day ..	As on 10th day, adding butter 15 grm. (½ oz.) =	34.0	56.1	105.2	1347
12th day ..	As on 11th day, adding butter 30 grm. (1 oz.) =	34.0	56.1	130.2	1580
13th day ..	As on 12th day, adding potato 30 grm. (1 oz.) =	40.0	56.6	130.2	1606
14th day ..	Vegetables (5%) 100 grm. (3½ oz.); eggs 2; meat 30 grm. (1 oz.); bacon 30 grm. (1 oz.); butter 30 grm. (1 oz.); tea 600 c.c.; coffee 200 c.c.; bovril 200 c.c. =	5.5	31.6	69.0	794

DIET TABLE IN DIABETES MELLITUS—*continued.*

	Carbohyd. gram.	Protein gram.	Fat gram.	Calories
15th day .. Vegetables (5%) 400 grm. (14 oz.); eggs 3; meat 60 grm. (2 oz.); cream 60 c.c.; potatoes 30 grm. (1 oz.); butter 90 grm. (3 oz.); oatcake 45 grm. (1½ oz.); bacon 30 grm. (1 oz.); tea 600 c.c.; coffee 200 c.c.; bovril 200 c.c. =	44.0	58.4	132.3	1650
16th day .. As on 15th day, adding oatcake 15 grm. (½ oz.) .. =	51.5	59.8	133.0	1693
17th day .. As on 16th day, adding potato 15 grm. (½ oz.) .. =	54.5	60.1	133.0	1706
18th day .. As on 17th day, adding porridge 2 tablespoonfuls and cream 15 c.c. =	65.0	63.1	137.0	1799
19th day .. As on 18th day, adding porridge 2 tablespoonfuls and cream 15 c.c. =	75.5	66.1	141.0	1892
20th day .. As on 19th day, adding porridge 2 tablespoonfuls .. =	85.5	68.6	142.0	1952
21st day .. As on 14th day .. =	5.5	31.6	69.0	794
22nd day .. As on 20th day, adding bread 7.5 grm. (½ oz.) .. =	90.0	69.1	142.6	1978
23rd day .. As on 22nd day, adding bread 7.5 grm. .. =	94.5	69.6	143.2	2004
24th day .. As on 23rd day, adding bread 7.5 grm. .. =	99.0	70.1	143.8	2030
25th day .. As on 23rd day, adding bread 7.5 grm. .. =	103.5	70.6	144.4	2056
26th day .. As on 25th day, adding egg 1 =	103.5	76.6	150.4	2137
27th day .. As on 26th day, adding cheese 30 grm. (1 oz.) .. =	103.5	79.2	161.4	2250
28th day .. As on 14th day .. =	5.5	31.6	69.0	794
29th day .. Vegetables (5%) 400 grm. (14 oz.); eggs 4; meat 90 grm. (3 oz.); cream 90 c.c.; bacon 30 grm. (1 oz.); butter 90 grm. (3 oz.); cheese 30 grm. (1 oz.); oatcake 45 grm. (1½ oz.); bread 30 grm. (1 oz.); potatoes 30 grm. (1 oz.); porridge 6 tablespoonfuls; tea 600 c.c.; coffee 200 c.c.; bovril 200 c.c. .. =	103.5	95.2	171.4	2408
30th day .. As on 29th day, adding cream 30 c.c. .. =	104.2	96.0	176.0	2456

The 30th day meals might be arranged as follows:—

7 a.m. Tea, large cup, with cream, 3 teaspoonfuls.

Breakfast. Coffee, large cup with cream 3 teaspoonfuls; porridge, 6 table-
spoonfuls with cream, 2 oz.; oatcake, ½ oz. with butter; bacon, 1 oz.
with 1 egg.

Dinner. Bovril, large cup; meat, 3 oz. with potato 1 oz.; vegetable, 6 oz.
with butter and 2 eggs; oatcake, 1 oz. with butter and 1 oz. cheese.

Tea. Tea, large cup with cream 3 teaspoonfuls; bread, 1 oz. with butter;
vegetable, 4 oz. with butter.

Supper. Coffee, large cup with cream 3 teaspoonfuls; vegetable, 4 oz. with
butter and 1 egg.

If glycosuria constantly reappears about the 2000 calorie limit, as it often
does in cases of moderate severity, and if the arduous employment of the

patient necessitates a greater food intake, the use of insulin for a prolonged period is indicated.

Insulin Treatment.—Some theoretical considerations in regard to insulin are given in a separate article (*see INSULIN*), and its practical use is dealt with here. The Insulin Committee of the University of Toronto¹⁷ give rulings as to the use of insulin which may be summarized as follows. The indiscriminate use of insulin in the treatment of diabetes mellitus is a real source of danger. At the beginning of treatment, all patients with diabetes, except those suffering from severe acidosis and coma, should be put to bed and given a basal maintenance diet, containing sufficient protein to replace the daily wear of the tissues (approximately 0.3 grm. per pound of body weight) with additional calories supplied by carbohydrate and fat. (*See about 3rd or 4th day of Diet Table above.*) If the urine becomes free from sugar on this diet, it should be gradually raised until the patient is receiving an adequate diet for the performance of the ordinary duties of life. If he remains aglycosuric on this diet, insulin is not indicated, and approximately 75 per cent of diabetics may be controlled by dietetic treatment only. If, however, after a week's treatment on basal diet, the urine is not free from sugar, insulin will be desirable. In cases of diabetic acidosis with coma, insulin should be given immediately. The Medical Research Council,¹⁸ in a report summarizing the results of the earlier work with insulin, come to a similar conclusion, that all ordinary cases of diabetes should first be put for a time on one of the forms of restricted diet, and that in cases with proved excess of blood-sugar, if the patient fails to tolerate any diet with less than 1000 calories in twenty-four hours, insulin should be given systematically. (*See 9th day of Diet Table above.*) As a rough indication of dosage, this report states that each unit of insulin can provide for the efficient consumption of 2 grm. carbohydrate in the food of a completely diabetic patient, and that the same dose should provide for 4 grm. of protein (i.e., independent of any help from the patient's own pancreas).

The suitable dose of insulin may lie in different cases anywhere between 10 and 100 units. Joslin¹⁹ enjoins great caution before giving more than 60 units in twelve hours, a knowledge of the blood-sugar, urine-sugar, and clinical state of the patient being the guide to treatment. Insulin, however, has this advantage over other dangerous drugs that over-dosage causes a warning train of symptoms before the serious results ensue. If the blood-sugar be reduced by its administration below the normal 0.1 per cent—a condition known as hypoglycæmia,—the patient begins to feel nervous, tremulous, and tired. When the percentage falls to about 0.07, sweating and tremor become evident, the patient often showing mental symptoms and lapsing into unconsciousness as it reaches 0.03. Treatment of the hypoglycæmia then becomes imperative, but is of the simplest nature—consisting of the administration of the juice of an orange or of one to three teaspoonfuls of sugar, and is expedited by the hypodermic injection of 1 c.c. of the 1-1000 solution of adrenalin. Banting, Campbell, and Fletcher²⁰ similarly, for hypoglycæmia induced by over-dosage with insulin, recommend 50 to 100 c.c. of orange-juice to which 5 to 25 grm. of glucose are added, and, if the patient has become unconscious, the dose of epinephrin mentioned above. When a patient has once suffered from this reaction he is quick to notice its onset again, and thus means may be taken at once to administer the necessary remedies, the question of glycosuria being for the time disregarded. As Rowe²¹ points out, this accident is liable to occur in the cases that are occasionally met of renal diabetes; if these receive insulin the procedure is wrong, and is liable to result in hypoglycæmia. For the recognition of renal diabetes see MEDICAL ANNUAL for 1923, p. 138.

The beneficial effect of administering insulin together with carbohydrates

to *patients with acidosis* verging on coma, or actually in a state of coma, appears to be universally admitted by those who have used it in these circumstances. Davies, Lambie, Lyon, Meakins, and Robson²² record a group of cases of this nature. In one of these the patient was incoherent and unaware of her surroundings, with 0.39 per cent of blood-sugar, considerable ketonuria, lipæmia, and low alkali reserve. During the first twenty-four hours in hospital she received 120 units of insulin and 190 gm. carbohydrate (glucose). During the succeeding twenty-four hours the blood-sugar fell gradually to 0.11 per cent, the lipæmia disappeared, and the patient became practically normal. In spite of the large quantity of carbohydrate administered, the glycosuria amounted to only 5 gm. per hour at first, and by the end of twenty-four hours the urine was sugar-free. Meakins,²³ in another communication, mentions a case of coma in a young woman who received 80 units of insulin and 462 gm. of carbohydrate in the course of a day; within a day she was conscious and all signs of acidosis had disappeared. A similar case of juvenile diabetes of two years' standing which had been treated by vegetable diet with days of starvation is recorded by Major.²⁴ He developed coma, with blood-sugar 0.4 per cent, and was treated by 75 units of insulin daily. Three months later he was in good health and rapidly gaining weight on 15 units of insulin daily, with a diet of 55 gm. carbohydrate, 85 gm. protein, and 100 gm. fat. Starling²⁵ considers that in diabetic coma insulin is of immense value, and should then be given in a dose of 80 to 100 units along with large doses of glucose, the latter preferably administered in solution intravenously.

With regard to the dosage of insulin *in the average case*, Maclean²⁶ considers that while insulin is a most dangerous remedy when great care is not taken in its use, yet if the dosage given is not large enough to make the urine quite sugar-free, and if the patient always gets food containing carbohydrate shortly after each dose is given, the remedy would appear to be safe. Further, the worse the case of diabetes, the less dangerous does it appear to give large doses of insulin. Maclean lays down the following details as to administration. Precautions must first be taken to make sure that the case is suitable for insulin, that it is not one of renal diabetes, etc. The effect of dietetic treatment should be tried in the first place. The diet while insulin is being given should contain at least 30 to 40 gm. of carbohydrate (*see 9th to 13th days in Diet Table above*), and it is a good plan to divide the food so that there are two large meals containing most of the carbohydrate, and two smaller meals, daily. He begins by hypodermic injection of 10 units of insulin twice daily twenty to thirty minutes before the large meals. This dosage is continued for three days, and if the urine still contains sugar the dose is raised to 15 units. After three days more the doses are increased to 20 units before the morning meal and 15 units before the evening meal, and if the urine still shows sugar after three days, to 20 units before each meal. He is doubtful if this dose should be exceeded unless means are available for checking the result by examination of the amount of blood-sugar. When the urine becomes free from sugar, he thinks it is safe to diminish the morning and evening doses by 5 units each, and add a little more carbohydrate to the two larger meals. When sugar again appears in the urine, the dose of insulin may again be increased by 5 units. A dose of 15 or 20 units in these circumstances may be continued for a long period. Lyon²⁷ considers that a suitable quantity of insulin for initial dosage may quite well be calculated, without blood examination, by an estimation of the daily amount of sugar excreted in the urine when the patient is on a low maintenance diet, the proportion being 1 unit of insulin for every 2 gm. of sugar lost. For example, if, on a diet providing 2000 calories, 60 gm. of sugar were excreted, 30 units of insulin might be expected to prevent this. The

maintenance dose of insulin he finds to be usually 10 or 20 units daily, and in most cases 10 units in the morning suffice to carry the patient along on a diet which will allow him to work. He recommends that the insulin should be injected two hours before the meal containing most carbohydrate (breakfast), the object being to ensure that the periods of maximum insulin activity and of highest blood-sugar coincide.

The effect of periodical (weekly) starvation days in diminishing blood-sugar and glycosuria should not be forgotten. This is sometimes quite as effective an agency as insulin. Thus in one case of severe diabetes losing in the urine 180 grm. of glucose daily with blood-sugar 0.38 per cent, observed over several months by the writer, a daily dose of 30 units of insulin continued for six days failed to reduce the morning blood-sugar below 0.26 per cent, or to abolish the glycosuria, while the diet remained at slightly over 2000 calories; but when the plan was adopted of stopping the insulin one day each week and giving no food on that day, the urine next day became free from sugar and showed only a trace on other days. The patient ultimately became able to carry on this diet in good health, even without insulin, though still passing a trace of sugar. Insulin must not, of course, be given on foodless days.

Other Methods of Treatment.—**Antipituitary Serum** in the treatment of diabetes is recommended by Legiardi-Laura.²⁸ It is obtained by treating the horse with parenteral administration of posterior pituitary extract, and on injection into diabetic patients it increases the carbohydrate tolerance in 50 or 60 per cent, as shown by disappearance of glycosuria with increased intake of carbohydrates. **Karlsbad Water**, containing sulphate of soda, is specially commended, after research by Arnoldi and Roubitschek,²⁹ for its effect in increasing the alkali reserve of diabetics and so preventing the onset of acidosis; they recommend 150 to 200 c.c. of the water twice daily. In commencing coma, von Noorden³⁰ approves of 150 to 200 grm. of Brandy in a day, together with Alkalis either intravenously or by enema. **Levulose** in treatment of diabetes is reported by Desgrez³¹ to be valuable, because the different sugars are not physiologically equivalent; three doses of 10 grm. are given daily for two eight-day periods in each month; these are supplemented with **Calcium Phosphate and Yeast**. **Thrice-boiled Vegetables** are recommended by Croll,³² as they were suggested by Allen in 1915; they should be cut into small pieces and boiled in thirty times or more their volume of water; the reduction of carbohydrate content obtained reduces such vegetables as turnip, carrot, beet, squash, and even potato below the carbohydrate value of ordinary green vegetables, and thus the diabetic's dietary choice is greatly extended. The value of the **Diabetic Clinic** for controlling diabetes at the out-patient department of the Lakeside Hospital, Cleveland, is explained by Christie;³³ the physician-in-charge holds consultations and lectures to the assembled patients on the disease; a dietitian gives demonstrations on foods and cooking; a social worker investigates the home surroundings of the patients; and a laboratory assistant carries out various examinations of blood and urine and teaches the patients to test their own urine.

Surgical Treatment.—There is a double relationship between surgery and diabetes. In the first place, diabetic gangrene is an occurrence of some frequency, and the surgeon may hesitate between the evils of operation and non-interference, or may desire some medical treatment to be carried out before he operates. Secondly, some septic focus is occasionally the cause of precipitating the onset of diabetes or of making its course more serious. Foster³⁴ considers that a preliminary treatment with insulin is of great use in making the operation safer in all such cases. In other cases, as pointed out by Moore,³⁵ diabetics with gangrene may be greatly benefited and surgical intervention obviated, as in

the case of an elderly man with gangrene of the foot who received only 25 units of insulin. In other cases, however, presented by Strouse and Schultz,³⁸ when diabetes is complicated by infection, insulin fails to produce much effect. Cohen³⁷ records 5 cases of gangrene and other surgical conditions requiring operation in diabetics; these were all treated for a short time before operation by insulin, and he considers that, but for this, death would have followed the operation. Root³⁸ records 7 cases in which successful operations were performed for diabetic gangrene; these occurred before insulin was available, and he thinks that a liberal supply of carbohydrate food for forty-eight hours before operation was beneficial. Young³⁹ analyses 99 cases of operation on diabetics with 16 deaths; he concludes that few, if any, operations which should otherwise be done need be refused merely because the patient has diabetes; if gangrene is not associated with arteriosclerosis it can generally be successfully treated without operation; in septic cases the diabetes can be much better handled after drainage.

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DIARRHŒA, FLAGELLATE. (See FLAGELLATE DIARRHŒA.)

DIGITALIS IN HEART DISEASE.

Drs. C. Lian and L. Pollet.

(Translated by Carey F. Coombs, M.D., F.R.C.P.)

L. T. Gager¹ has recently reminded us of the mistake that the profession is in danger of making from following too slavishly the dictum of Mackenzie, that it is in the total arrhythmia of post-rheumatic mitral disease that the best results are achieved with digitalis. While this dictum is true, there are many who go further and refuse to give digitalis for heart disease, except for this particular syndrome. One of us² has already entered a protest against this attitude. The fact is that before a valvular lesion brings the heart down to a level of marked insufficiency a stage of relatively mild insufficiency has already been traversed. For such conditions, although it is true that at first the treatment is directed to general hygiene, and to the use of such drugs as valerian and bromide, yet there is room later on for the use of mild cardiac tonics, such as sparteine, strophanthus, etc. Digitalis is not called for, and is indeed better avoided, as the very name of the drug frightens patients. Some of these patients, however, find their breath so short that they have to consider a change of occupation, and for such digitalis may be used, even where there is neither arrhythmia, visceral congestion, nor œdema. Not only may considerable relief be obtained by such a course, but also it appears to delay indefinitely the onset of a more serious degree of insufficiency. It is a mistake to suppose that digitalis is a drug to which the heart becomes accustomed, and therefore fails to react. The failure of reaction is due, not to this, but to

exhaustion of the cardiac muscle to such a pitch that it can no longer react to treatment. This is not to say that striking results are to be expected from digitalis in the treatment of serious cardiac insufficiency where the heart remains regular. As Vaquez³ has lately remarked, incurable breakdown is more often seen in the presence of a regular than of an irregular pulse. However, White⁴ and also Christian⁵ published accounts of good results gained by the use of digitalis for the relief of cardiac insufficiency without arrhythmia.

The question of *dosage* was fully discussed by us in last year's MEDICAL ANNUAL,⁶ and here it need only be added that we think it wiser to adopt an opportunist attitude than otherwise, using small doses for symptoms which, though irksome to the patient, appear to fall within the category of trivial cardiac insufficiency, reserving medium and full doses, and, above all, dosage to the point of saturation, for conditions of medium and urgent cardiac insufficiency, returning by degrees to smaller doses in order to maintain the good results achieved. Thus, Francis R. Fraser,⁷ in speaking of the good results obtained by giving a massive dose of tincture of digitalis, divided into three parts given at intervals of six hours, considers that such a method is of value only when the symptoms are so urgent that immediate relief is necessary. Cases of auricular fibrillation with rapid ventricular rates and urgent symptoms are peculiarly suitable.

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DIPHTHERIA. (See also TONSILS, DISEASES OF.) J. D. Rolleston, M.D.

EPIDEMIOLOGY.—M. Graham and E. H. Golaz¹ describe an unusual epidemic of diphtheria which occurred in Austin, Texas, in the spring of 1922; 52 cases out of a total of 71 were traced to infected milk. The membrane was atypical, and the infection was unusually virulent. More than 80 per cent of the cases were in adults. One of the cows, which had been infected by a milkman, had three teats covered with thick, black scabs, which when removed left a ragged, ulcerated surface that exuded a mucopurulent fluid. Pure cultures of diphtheria bacilli were obtained from the lesions, and also from the milkman's throat, and diphtheria bacilli teemed in the milk.

P. F. McGuire and A. P. Hitchens,² of the U.S. Army Corps, cultivated the throats of 1080 students in the Citizens' Military Training Camp in 1922. In only 9 cases, or 0.83 per cent of the cultures, were virulent diphtheria bacilli found. The Schick test was made on 833 students, and 55 per cent gave a positive reaction. In spite of this high rate of susceptibility to diphtheria and the number of persons in close association with those carrying diphtheria bacilli in their throats, no clinical diphtheria developed during the period of training. Among seven of those with virulent diphtheria bacilli, three gave positive Schick reactions, the others were immune.

SYMPTOMS AND COMPLICATIONS.—J. Gugenheim,³ who records 12 illustrative cases, emphasizes the fact that *diphtheria of the middle ear* may simulate simple aural suppuration, since the characteristic feature of diphtheria, namely, fibrinous exudation, may be absent. In such cases bacteriological examination alone can clear up the diagnosis. Infection of the middle ear may be primary, secondary to pharyngeal diphtheria, or be conveyed through the external auditory meatus.

R. M. Blanchard⁴ reports a case of primary diphtheria of the middle ear in a soldier, age 22, who developed a discharge from both ears and a temperature of 101–103° two days after a bad cold. The tympanic membrane was covered

with an exudate, and diphtheria bacilli were cultivated from the discharge from both ears. Recovery followed injection of 10,000 units of diphtheria antitoxin.

W. Stupka⁵ has collected 34 cases of apparently undoubted *diphtheria of the œsophagus* from the literature of the last one hundred years, the first of which was recorded by Bretonneau and the last two by the reviewer (see MEDICAL ANNUAL, 1914, p. 209), as well as 11 cases of *post-diphtheritic stenosis of the œsophagus*, of which 2 are original. More than half the cases of diphtheria of the œsophagus were in children under ten; 16 were males, 9 females, and in 9 the sex was not stated. The upper part of the œsophagus was affected in 13 cases, the entire œsophagus in 17, and the lower part only in 4. The symptoms of diphtheria of the œsophagus are ill marked. Dysphagia is the most important and frequent symptom, but its value is diminished by the co-existence of the faucial affection. The coughing up of membranous casts of the œsophagus, which occurred in 4 cases, is of considerable diagnostic importance. The diagnosis of post-diphtheritic stricture is made, as in the case of œsophageal stricture due to other causes, by the use of the bougie, œsophagoscope, and X rays.

C. Schwensen⁶ examined 568 cases of diphtheria, 118 of which were severe, for signs of *cardiac impairment*. Acute myocarditis was found in 17 per cent of the 568 cases and in 75 per cent of the severe cases. Typical symptoms of myocarditis were present in all cases which died in the acute stage. During the course of diphtheria two distinct types of disturbance of rhythm were seen: (1) An early type which appeared on an average upon the eighth day; in the course of a few hours to a few days the rhythm usually became very complex, but still formed a distinct, easily recognizable type. All these patients died of heart failure in the acute stage of diphtheria. (2) A late type, which consisted of extrasystoles appearing on an average upon the thirty-third day of illness. None of these died of heart failure. On re-examination of the patients at least two years after their discharge from hospital, signs of impairment of the heart were found in more than two-thirds of those examined, so that diphtheria must be considered as an important cause of heart failure later in life.

V. Bie and C. Schwensen⁷ report 2 cases of severe early arrhythmia in diphtheria in children, age 6 and 10 years respectively, treated by digitalis. After administration of the drug the arrhythmia stopped, and the tracings became normal except for some extrasystoles. The first case recovered, and the second died in a few days from progressive acute myocarditis which attacked the atrioventricular bundle and produced partial heart block.

P. Lereboullet, P. L. Marie, and L. Leprat⁸ have investigated the presence of *glycæmia* in diphtheria, first because stress has recently been laid on the hypoglycæmia which usually accompanies suprarenal insufficiency, and, secondly, because severe forms of diphtheria are often accompanied by acute suprarenal insufficiency. In 3 cases of mild diphtheria the blood-sugar remained normal, but in 6 malignant cases the glycæmia was distinctly low, the hypoglycæmia in some cases being associated with signs of suprarenal insufficiency. If these findings are confirmed by further observations, hypoglycæmia in severe diphtheria may be regarded as an indication of the suprarenal involvement which is so frequent in diphtheritic toxæmia.

L. Bouchut and P. Durand⁹ describe the autopsy in a case of *diphtheritic paralysis* in a woman, age 26, which developed three weeks after a sore throat not recognized at the time as diphtheritic. Histological examination showed, in addition to the ordinary lesions of diphtheritic paralysis, the presence of diphtheria bacilli in the pons, and the bacilli were also found in cultures of

the frontal lobe, pons, bulb, olfactory nerves, and all the roots of the bulbar nerves.

S. Rosenbaum¹⁰ records 2 cases of infants, both 2 months old, who developed palatal palsy after persistent nasopharyngeal catarrh, cultures of which showed diphtheria bacilli, though in neither case was membrane seen in the nostrils. Rosenbaum emphasizes the gravity of palatal palsy in the first few months of life, owing to its interfering with nutrition, and points out that its diphtheritic origin can easily be overlooked, especially when the disease has been confined to the nose.

J. C. Regan, C. Regan, and Brickhouse Wilson¹¹ review the literature (*see* MEDICAL ANNUAL, 1920, p. 93; 1922, p. 106), and record their observations on 28 specimens of cerebrospinal fluid from 16 cases of diphtheritic paralysis which were examined at various intervals from the second day to the eleventh week of paralysis, 22 being in the first four weeks. Nearly two-thirds of the patients had extensive generalized paralysis, and in 5 death took place. The writer's conclusions are as follows: (1) The cerebrospinal fluid in diphtheritic paralysis is clear and of normal or slightly raised tension; (2) The Wassermann reaction was uniformly negative; (3) The cell-count was always within normal limits, and the cells found were small lymphocytes; (4) The globulin was increased in less than a third of the cases, the increase being slight or moderate but never pronounced; (5) There was, therefore, in some cases a dissociation between the cytological and chemical findings; (6) The colloidal-gold reaction was the most constantly positive pathological reaction encountered. The reduction usually occurred in the syphilitic zone, occasionally extending into the higher dilutions. The reaction gradually subsided as the paralysis disappeared.

DIAGNOSIS.—C. A. Thomson¹² divides cases of non-diphtheritic acute stenotic laryngitis into: (1) those preceding measles, (2) those preceding scarlet fever, (3) those accompanying influenza, (4) those due to some unknown affection. Of 810 patients sent to the Willard Parker Hospital, New York, as having laryngeal diphtheria, 697 were proved by direct laryngoscopy to have diphtheritic laryngitis, and 113 non-diphtheritic stenotic laryngitis. A membrane was demonstrated in the larynx of all the 697 cases, while none of the 113 had laryngeal membrane. In stenotic laryngitis direct laryngoscopy showed congestion and swelling of the ary-epiglottic folds and arytenoids, swelling of the ventricular bands, reddened vocal cords, and a greater or less degree of subglottic stenosis.

J. G. M. Bullowa, R. C. Hardman, and H. R. Litchfield¹³ report cases to illustrate the fallacies which may result from the diagnosis of diphtheria by throat cultures and the dangers consequent upon delay in making a diagnosis from a laboratory report instead of from the clinical picture. They obtained 12 per cent more positive cultures from under the membrane than from the usual superficial cultures.

PROGNOSIS.—G. W. Ronaldson¹⁴ discusses the prognostic value of the serum phenomena in diphtheria. He points out that the favourable significance of a well-marked serum reaction was first described by the reviewer¹⁵ in 1904, and his own conclusions, which are based on the study of 1000 cases of diphtheria, confirm the reviewer's contention that the more marked the serum reaction the better the prognosis. Increased dosage raises the incidence of serum manifestations, whereas diphtheritic intoxication exercises an inhibitory influence both on the frequency and intensity of serum reactions. In very severe cases the rash is late in development, scanty, or entirely absent. On the other hand, a case with a well-marked urticarial eruption is not likely to end fatally, and the appearance of a secondary rash, which is usually of the

type of circinate erythema, enables one to forecast with confidence that the patient will not die nor suffer from a severe type of paralysis.

PROPHYLAXIS.—W. H. Park,¹⁶ in discussing toxin-antitoxin immunization against diphtheria, states that the preliminary Schick test is usually omitted in children under three years of age for two reasons: (1) Two-thirds of these children require the toxin-antitoxin injections any way; (2) It is not certain whether those with a negative reaction are immune because of an unusual persistence of antitoxin given them by their mothers, or because of the active development of antitoxin in their own bodies. In practical school work the preliminary Schick test is often omitted up to the age of six years, because it is easier to inject the children at once than to wait for the result of the test. The omission of the test facilitates the introduction of immunizing injections in the schools. Above the age of six the preliminary Schick test should be made whenever practicable. No child should be pronounced immune from diphtheria because it has received three immunizing injections of toxin-antitoxin. A negative Schick test is absolutely necessary before one is justified in making such a statement on issuing a certificate. Injections of toxin-antitoxin are inadvisable before the age of six months. During this time most of the infants retain the antitoxin received from their mothers. Up to the age of three months, immunizing injections are usually ineffective, as the infant's tissues do not respond sufficiently to produce antitoxin. Under usual conditions it is safe to wait until the child is nine months old, and then to give injections on the first suitable occasion. As the child grows older, the danger from diphtheria gradually lessens, and the percentage of those developing annoying local and constitutional reactions slowly increases. Park states that among a total of 90,000 Schick-negative or injected children, only 14 contracted diphtheria; whereas among a total of 90,000 control children, 56, or four times as many, developed the disease.

After pointing out that diphtheria ranks third after diarrhoea and pneumonia among the fatal diseases of children, A. Zingher¹⁷ states that the Schick test has been performed on more than 150,000 school children in New York within the last two years. A high proportion of positive reactions, varying in different schools from 60 to 85 per cent, was found in the entering classes in the kindergarten and 1A grades. Zingher therefore recommends that toxin-antitoxin injections should be given to these young people without the preliminary Schick test. The schools situated in the less congested sections of the city, and attended by the children of the well-to-do classes, showed, as a rule, 100 to 200 per cent more Schick-positive reactors than those located in the crowded parts and attended by poorer children, in whom repeated exposure to infection with diphtheria bacilli was probably the most important factor in the development of natural immunity to the disease. Racial and hereditary factors, although less important, also played a rôle. Females at all ages showed a somewhat larger percentage of positive reactions than males, and also more negative-pseudo and positive-combined reactions.

P. H. Kramer¹⁸ records the results of Schick testing and injection of toxin-antitoxin among the nurses before taking up duty in the diphtheria pavilion in the Rotterdam Municipal Hospital. Of 114 persons, all above twenty years of age, 47 who gave a positive Schick reaction were injected with toxin-antitoxin; and of the remaining 67, 55 gave a completely negative reaction and 12 a pseudoreaction. Of the 114 nurses, 90 remained sufficiently long in the diphtheria pavilion to justify conclusions; 38 (42 per cent) received toxin-antitoxin, and 52 (58 per cent) were not injected. Twelve diphtheria carriers were found: 6 among the immunized and 6 among those with a negative reaction. Three nurses, two of whom had given a negative Schick reaction

and had not been injected with toxin-antitoxin, developed follicular tonsillitis, which was cured without serum treatment. Two, who had given negative reactions, developed definite attacks of diphtheria, complicated in all cases by paralysis of the palate; whereas none of those who had been given toxin-antitoxin contracted the disease. Under these conditions Kramer has decided not to perform Schick's reaction any more, but to treat all persons exposed to diphtheria with toxin-antitoxin.

TREATMENT.—A memorandum¹⁹ recently issued by the Ministry of Health recommends that in every case where a provisional diagnosis of diphtheria has been made, a dose of at least 8000 units of **Antitoxin** should be injected as early as possible without waiting for bacteriological confirmation of the diagnosis. The injection may be subcutaneous or **Intramuscular**, but the latter is to be preferred, as absorption is more rapid (*see MEDICAL ANNUAL*, 1915, p. 220; 1921, p. 153). If there is no improvement, or if it is clear that the disease is advancing, a second dose of equal magnitude should be given, followed by a further dose if no improvement occurs. Diphtheria antitoxin should not be administered to a person not presenting local signs or symptoms of diphtheria in whose nose or throat diphtheria bacilli have been found, as there is no evidence that antitoxin has any effect in causing disappearance of diphtheria bacilli from a chronic carrier. A prophylactic dose is rarely necessary for contacts if they can be kept under daily observation and antitoxin administered at short notice if symptoms develop.

Commenting on this memorandum, C. B. Ker²⁰ states that he gives 4000 units in mild cases in which only the tonsils are involved, and without undue glandular enlargement or evidence of severe toxæmia. If the pillars on one or both sides are affected, the dose is 5000 to 6000 units; and if the uvula or palate is involved, 8000 units. Cases with nasal involvement or croup receive an initial dose of 10,000 units, and the dose is repeated in eight or twelve hours. Ker states that if the general practitioner gave 2000 or 3000 units in every case in which he thought it necessary to take a swab, there would be a phenomenal fall in the case-mortality of diphtheria. [This is an excellent suggestion which the practitioner should not be afraid of adopting through a morbid fear of anaphylaxis.—J. D. R.]

P. Iversen²¹ states that at the Blegdams Hospital, Copenhagen, 406 diphtheria patients who had not previously had serum were given **Intravenous Injections of Antitoxin**: 27, or about 7 per cent, had a rigor or collapse within two hours of the injection, the rigor lasting from ten to thirty minutes. A serum rash appeared in 54 per cent between the fourth and fourteenth days, the average day being the ninth; 99 cases were re-injected from a few months to fifteen years after the first injection. In these cases no advantage was gained by desensitizing with 1000 units subcutaneously. Excluding 9 cases in which only 1000 units were given subcutaneously, 74 per cent of the re-injected cases had a serum rash on the first to tenth day, usually on the sixth day. Iversen is of opinion that intravenous injection of diphtheria antitoxin is not a dangerous method, and should be the method of choice even in patients who have previously received serum. The injection should be given slowly, and temporarily or definitely discontinued on the appearance of any reaction.

H. R. Litchfield and R. P. Hardman²² have employed **Suction** exclusively in the treatment of 46 cases of laryngeal diphtheria, the technique being as follows: The patient is wrapped in a mummy bandage as for intubation, and through a Jackson laryngoscope the membrane and mucus are aspirated by a 16 to 18 French silk or metal catheter which is connected with an aspirating bottle and in turn connected with an ordinary electric suction pump capable of producing 5 to 10 inches of vacuum. Laryngoscopic examination with

suction may be repeated in severe cases every six or eight hours, but many of the cases required only one treatment. Convalescence from laryngeal diphtheria is shortened by this method, as it spares the patients the strain they were formerly subjected to in the desire to avoid intubation.

R. W. Gover and R. P. Hardman,²³ who have employed the method in 50 cases, with 4 deaths, point out that it should be undertaken only by those who are experienced in direct laryngoscopy and are able to do a rapid intubation or tracheotomy. The entire procedure lasts only a few minutes, and in most cases the relief is immediate and marked. Although the treatment will not always prevent intubation or tracheotomy, it will greatly lessen the number requiring it, and consequently reduce the mortality.

REFERENCES.—¹*Jour. Amer. Med. Assoc.* 1922, ii, 1300; ²*Ibid.* 1923, i, 665; ³*Zeits. f. Hals- u. Ohrenheilk.* 1922, 215; ⁴*Jour. Amer. Med. Assoc.* 1922, i, 1458; ⁵*Deut. Zeits. f. Chir.* 1922, clxx, 1; ⁶*Jour. Infect. Dis.* 1922, xxx, 279; ⁷*Ibid.* 308; ⁸*Paris méd.* 1922, ii, 417; ⁹*Lyon méd.* 1922, 918; ¹⁰*Monats. f. Kinderheilk.* 1922, 494; ¹¹*Amer. Jour. Dis. Child.* 1923, i, 284; ¹²*Jour. Amer. Med. Assoc.* 1922, i, 1456; ¹³*Ibid.* 1923, i, 240; ¹⁴*Brit. Jour. Child. Dis.* 1923, 129; ¹⁵*Practitioner*, 1904, ii, 795; ¹⁶*Jour. Amer. Med. Assoc.* 1922, ii, 1584; ¹⁷*Amer. Jour. Dis. Child.* 1923, i, 392; ¹⁸*Nederl. Tijds. v. Geneesk.* 1923, i, 1406; ¹⁹*Brit. Med. Jour.* 1922, ii, 284; ²⁰*Lancet*, 1923, i, 642; ²¹*Ibid.* 694; ²²*Jour. Amer. Med. Assoc.* 1923, i, 524; ²³*Arch. of Ped.* 1923, 170.

DISSEMINATED SCLEROSIS.

Sir James Purves-Stewart, K.C.M.G., C.B., F.R.C.P.

ETIOLOGY.—For a number of years past the tendency of modern neurology has been to regard disseminated sclerosis as a disease of infective origin. Pierre Marie suggested that various infective fevers, such as typhoid, scarlatina, measles, influenza, might produce disseminated sclerosis as a sequela. On the other hand, the types of lesion in multiple sclerosis and their mode of evolution differ both from ordinary inflammatory foci following the usual febrile illnesses, and also from the widespread and variable lesions of epidemic encephalitis. It is therefore probable that multiple sclerosis is a special type of infection. Clinically, one of the maladies which sometimes closely resembles it is cerebrospinal syphilis, with its multiple and asymmetrical lesions. Curiously enough, in both diseases the colloidal-benzoin reaction is positive in the cerebrospinal fluid. There is no evidence, however, that multiple sclerosis is syphilitic in origin. But there is a good deal to support the view that it may be due to infection by a spirochæte of some sort.

Direct bacteriological observations have thrown some light on the subject, bearing in mind the difficulty of identifying spirochætes in nervous tissues, even in general paralysis itself. The first positive observation was by Siemerling. In his patient, who had suffered from typical disseminated sclerosis, four or five living spirochætes were demonstrated in various parts of the brain two hours after death. A similar observation was made by Büscher, fifteen hours after death, in another patient from Siemerling's clinic; whilst in a third case recorded by Speer, numerous spirochætes were demonstrated nine hours after death. All these observations were made with the ultra-microscope. No stained specimen of spirochæte was demonstrated, even by Levaditi's silver-impregnation method.

Experimental observations, so far, have yielded mostly negative results, including those of Birley and Dudgeon¹ in England, and of Guillain, Jacquet, and Léchelle² in France. On the other hand, a few positive experimental facts are recorded. In some cases, inoculation of blood or cerebrospinal fluid from patients with multiple sclerosis has produced paralytic symptoms in animals. Bullock, in 1913, injected cerebrospinal fluid subcutaneously into rabbits, and observed paralytic signs in the limbs after an incubation of 13

to 22 days; the lesions were diffuse and confined to the spinal cord. The cerebrospinal fluid preserved its infectivity after filtration and after preservation at freezing-point for 14 days, suggesting either a filtrable virus or a soluble toxin. Transmission from the infected animal to others was not secured; moreover, injection of cerebrospinal fluid from another patient with multiple sclerosis did not give the same results. Bullock (now named Gye³), in a series of 129 rabbits and 15 guinea-pigs, obtained paralytic symptoms in 17 rabbits and 9 guinea-pigs. Control experiments with normal cerebrospinal fluids were not performed. Other observers have been able to demonstrate, in inoculated animals, lesions analogous to those of multiple sclerosis in the human subject. This has been accomplished once in the monkey by Kühn and Steiner.⁴ In March, 1917, they inoculated a healthy *Macacus rhesus* hypodermically with 1 c.c. of cerebrospinal fluid from a young girl with multiple sclerosis. In February, 1918, the monkey had a transient paraplegia of short duration. In June, 1918, it showed paraplegia *en flexion* without nystagmus or tremors. Four weeks after the appearance of this paraplegia the animal was killed. The centrum ovale of the cerebral hemispheres showed multiple irregular foci closely resembling those of multiple sclerosis, with abundant granular corpuscles, severe changes in the myelin, relative integrity of the axis cylinders, and marked glial proliferation, especially at the periphery of the focus; there was no cellular infiltration or vascular lesion. This case, if confirmed by further observations, is of great importance, especially in view of its long period of incubation. Kühn and Steiner, however, in this case failed to demonstrate the causal organism. These latter authors claim to have observed living spirochaetes in the blood and cerebrospinal fluid of inoculated rabbits and guinea-pigs. In 13 cases thus examined, they obtained positive results in 5, the spirochaetes being found not only with the ultra-microscope, but were also stained by Loeffler's method and impregnated with silver by Levaditi's process. A similar case was published by Marinesco, in 1918, in conjunction with Pettit and Roux. But all attempts at that time to transmit the disease to other animals in series, failed. Later, however, Pettit⁵ tried once more with material obtained from a patient of Guillain's. This time he succeeded in inoculating rabbits, guinea-pigs, and a monkey by intracerebral and intraspinal injections of cerebrospinal fluid. He found spirochaetes in the cerebrospinal fluid of the inoculated animals, and succeeded in transmitting them from rabbit to guinea-pig, from guinea-pig to rabbit, and from monkey to rabbit.

The spirochaete originally described by Kühn and Steiner was named by them *Spirochaeta argentinenses* (from the Latin name for Strasbourg, where these authors observed it for the first time). The morphological characters of this spirochaete have been so variously described by different observers that it is prudent to await further confirmatory evidence before accepting it as the true pathogenic organism of multiple sclerosis.

A further point of interest is the mode of infection by the supposed organism of multiple sclerosis. One would naturally expect that the infection of the nervous system is preceded by a stage of generalized infection. A history of febrile illness, perhaps months or years before the development of nervous symptoms, is so easily found in almost every patient that it is difficult to identify any particular attack as the initial infection. Schultze and Steiner think that multiple sclerosis is specially liable to affect manual workers, country folk, and especially those who have to work with wood. Steiner suggests that the disease is not transmitted directly from one patient to another, but that it is inoculated by insects living in wood, and by bugs of various sorts. He inquired from a number of patients with disseminated sclerosis as to how many

of them remembered having been bitten by bugs. In a first series of 42 cases he found 21 positive cases; in a second series of 44 he found 24.

The foregoing studies by numerous observers, although not yet conclusive, show that the problem of multiple sclerosis is a field for fruitful research.

DIAGNOSIS AND TREATMENT.—Disseminated sclerosis is one of the most tragic of nervous maladies, affecting as it does young adults in the early prime of life. Its onset is often apparently trivial, and the first attack of the disease, consisting in a mild pyrexial attack, followed by transient paresis of a limb, or of an ocular muscle, or of an optic nerve, etc., is commonly regarded either as influenza or hysteria. But, sooner or later, another attack, followed by an additional nervous lesion, follows, and when a series of such attacks succeed one another, the diagnosis of disseminated sclerosis becomes established. These recurrent attacks vary in severity, but, whether mild or severe, each attack heralds the formation of a patch of sclerosis in the central nervous system. The position of these patches is quite haphazard. According to the situation of the various lesions we have the polymorphic symptoms of the disease. If a patient has had more than one attack of transient weakness, not necessarily in the same part of the body, we should be on the look-out for disseminated sclerosis. In such cases we should pay particular attention to the optic discs, watching for signs of pallor, especially in their temporal halves, and to the condition of the abdominal reflexes, which tend to disappear early in the disease. The presence of an extensor plantar reflex, or of nystagmus, is strong confirmatory evidence, serving at once to exclude the diagnosis of mere hysteria.

The subsequent history of a case of disseminated sclerosis is highly characteristic. When the immediate inflammatory reaction around each patch of sclerosis has subsided, the permanent damage which remains is frequently slight. Thus improvement often occurs after each pyrexial and paralytic attack, and marked remissions in the course of the disease are the rule. Once chronic degenerative changes are established in the central nervous system, the damage is irreparable. In order, therefore, to do much good in the way of treatment, it is essential to recognize the disease in its earliest stage and, if possible, to put an end to the series of pyrexial attacks which indicate the formation of fresh plaques of sclerosis.

When we turn to the various methods of treatment of disseminated sclerosis, it is important to realize that, owing to the natural remissions in the disease, it may happen that a spontaneous remission coincides with some particular method of treatment, which may thus gain unmerited credit as a therapeutic agent.

All sorts of drugs have been vaunted from time to time, including arsenic, antimony, iodides, mercury, even fibrolysin injections, and various vaccines—typhoid, streptococcal, etc. Clinical experience, so far, goes to show that, in the absence of a specific vaccine or antitoxin (both of which must await the identification of the causal organism) the most encouraging results have been obtained by **Arsenic**. Whether this is due to a spirillocidal effect is an open question. Johnson⁶ has recently emphasized the value of arsenic in a small series of 10 cases under his observation, and claims to have secured encouraging results in 8 of them by an intensive **Neosalvarsan** course. He prescribes six weekly intravenous injections of novarsenobillon (0.15, 0.3, 0.45, 0.45, 0.6, and 0.6 grm.), and this course is repeated at the end of six months. In the interval, and for a year subsequent to the second course of injections, the patient is given arsenic by the mouth in the form of liq. arsenicalis, 3 min., three times a day during alternate fortnights.

Curschmann,⁷ convinced of the spirochætal origin of the malady, urges energetic salvarsan treatment, preferably with silver-salvarsan. In otherwise

healthy adults he gives an initial intravenous injection of 0.1 grm., and increases this, if well tolerated on several successive occasions, to 0.2 grm., repeating these until a total of 2 grm. has been given. Or, owing to its greater simplicity of injection, he uses neosalvarsan, giving every five days 0.3 to 0.45 grm., up to a total of 5 or 6 grm. These treatments are repeated every four to six months.

REFERENCES.—¹*Brain*, 1921, xliv, 150; ²*Bull. et Mém. Soc. méd. des Hôp.* 1920, Nov. 5, 1362; ³*Brain*, 1921, xliv, 213; ⁴*Ergeb. d. inn. Med. u. Kinderheilk.* 1922, xxi, 251; ⁵*Bull. de l'Acad. de Méd.* 1922, April 4, 383; ⁶*Lancet*, 1923, i, 1208; ⁷*Munch. med. Woch.* 1923, March 16, 338.

DRUG ERUPTIONS.

E. Graham Little, M.D., F.R.C.P.

Wise and Parkhurst¹ examined eruptions due to some of the more recently introduced drugs, and give a formidable list.

Arsphenamine.—The first to be examined are the new arsenical preparations used in the treatment of syphilis. Their experience naturally lies with the American preparation arsphenamine. They distinguish between the subacute anaphylactoid dermatitis which appears in six to twelve days after the first injection, and the subsequent eruptions which have probably a different explanation. This is an important differentiation, as the drug may be continued after the subsidence of the reaction without much apprehension that this eruption will recur. The later exanthems come on usually after some weeks of the administration, and they simulate many types of lesion, usually of an urticarial or erythematous variety. Generalized dermatitis with desquamation may develop, with pus infections, hyperkeratoses, and changes in the hair and nails. There may be high fever and the patient may die. It would seem that seborrhœic skins are more susceptible to severe arsphenamine dermatitis. More rarely arsphenamine may give rise to what the authors call fixed eruptions, in which many sharply circumscribed, slightly elevated, smooth plaques, pink, red, yellowish, or brown, are seen, closely resembling eruptions from antipyrin and phenolphthalein. These eruptions tend to disappear in the intervals between the injections, and to reappear after each fresh dose. The authors note the comparative frequency of herpes simplex and herpes zoster following arsphenamine. They have not met with any example of arsenical keratosis.

Of more recent remedies, the following are noted by the authors :—

Barbital and Medinal.—Exanthemlike rashes simulating measles, sometimes with erosions of the mucosæ and sometimes with vesication, are reported, as well as fixed eruptions of the type mentioned above.

Codonal (a combination of codein and barbital).—One instance is mentioned of bluish-red itching plaques, scattered over the body and associated with fever, coming on within three hours after taking this drug.

Adalin and Bromural.—Urticarial eruptions, acne-like eruptions simulating bromide acne, purpuric lesions, eczematoid rashes, sometimes with the fixed plaque type, sometimes with exudation, have been noted. Old people seem to be more susceptible than young.

Phenobarbital (luminal).—Instances of a universal erythema, a morbilliform rash with subsequent desquamation, a scarlatiniform exanthem, sometimes with fever, sometimes followed by desquamation, have been noted. Lingual and oral erosions are specially often encountered with this drug, as is also the case with antipyrin and phenolphthalein.

Cinchophen.—Eruptions simulating angioneurotic œdema, erysipelas, scarlatina, urticaria, and mixed rashes, are reported. In one case a herpes zoster was noted while the patient was taking the drug.

Pyramidon.—This salt, a derivative of antipyrin, produces the rosette-like patches noted with that drug, as well as less characteristic eruptions simulating urticaria and purpura. The same symptoms may follow the administration of *melubrin*, another antipyrin salt.

Aspirin.—Eruptions with this drug are comparatively uniform, and include the symptoms of swelling of the soft tissues, especially of the face and other mucosæ, generally with extreme malaise. Less common are urticarial and scarlatiniform eruptions, and in two cases eruptions simulating dysidrosis are reported.

Hexamethylenamine.—The symptoms reported as following the taking of this drug include swelling of the eyelids, redness of the conjunctivæ, intense itching and burning all over the body, and urticaria.

Phenolphthalein.—This subject was dealt with very fully in last year's ANNUAL, and the authors report many new examples of the eruption: especially one interesting case of a nasal herpes which always recurred after the patient took a phenolphthalein pill.

Experimental Inquiry into the causes of Drug Eruptions, especially Bromide and Iodide: the Demonstration of Iodide and Bromide in the Body Fluids.—Wile, Wright, and Smith,² conducting this inquiry, devised a test so delicate that they could determine the presence of iodine in 10 c.c. of blood fifteen minutes after the ingestion of 5 gr. of potassium iodide. [The paper should be consulted for details.—E. G. L.] Bromide is more difficult. Chemical tests were marred by the presence of chlorides. The difficulties were, however, overcome, and the authors were able to determine that there was no trace of bromide or iodide in the local lesions such as the nodular and pustular types. In artificially produced blisters, however, in patients taking bromide or iodide, the drugs were easily demonstrated in the blister fluid. An interesting opportunity occurred of examining the blebs in a patient suffering from pemphigus who was taking 20 gr. of bromide three times a day. On the third day crops of blisters appeared, which were found to contain bromine. The authors are insistent on their observation that the pustules of bromide and iodide acne are not sterile as has been asserted, but contain staphylococci. The authors conclude their observations with the remark that the local lesions found in both drugs cannot be explained either on simple bacterial or simple chemical grounds, but probably involve a complex biochemical reaction. No evidence for allergic explanations could be adduced.

Bromide Eruption.—Costello³ reports a case of bromide eruption appearing in an infant three days after birth, the mother having taken bromide during the latter part of her pregnancy, the inference being that the infant had absorbed the drug via the placental circulation.

Boone⁴ reports a case of a boy, age six months, who developed patches of pustulation with an erythematous margin after being suckled by his mother, who was taking bromides, 45 gr. per day. No symptoms were noted until four and a half weeks after the drug was started in the mother, who never had any symptoms of bromide eruption herself.

Arsenical Keratosis followed by Cancer.—The development of epithelioma on arsenical hyperkeratosis is a very uncommon event when one considers its rarity as contrasted with the wide administration of arsenic. Semon⁵ reports a case developing in a patient, age 40, fourteen years after treatment by arsenic for psoriasis for seven years.

Discoloration of Skin.—Goeckermann⁶ describes two cases of localized pigmentation of the face, which could be ascribed to the use of cosmetic creams containing calomel. The first case, a spinster, age 43, had a brownish-grey pigmentation of the skin of the eyelids, nasolabial folds, chin, and neck, giving

her the appearance of an 'unwashed schoolboy'. Examination of the cream which she used habitually showed the presence of bismuth and mercury in large quantities. No actual proof of the deposit of these substances in the skin, however, could be made. The second patient, a married woman, age 31, had very nearly the same appearances. An examination of her face cream again showed much mercury. The author applied the cream used in the second case to his own arm after a preliminary washing with a weak solution of sodium bicarbonate, and it produced a black deposit upon his skin. Washing the discoloured area with a weak acid removed the pigmentation from the author's experimental discoloration, and this method of treatment was tried with both cases, an aqueous solution of 2 per cent acetic acid being used twice daily. Subsequently a 0.5 to 1 per cent aqueous solution of potassium cyanide was found to be more effective. In both cases the pigmentation became sensibly lighter. The author explains the discoloration in the patients by the supposition that their sweat happened to be alkaline, a fact which was demonstrated in one patient by the action of litmus paper. Alkaline sweat would appear to be rare, and this would perhaps explain the rarity of these cases of abnormal pigmentation.

REFERENCES.—¹*Arch. of Dermatol. and Syph.* 1922, Nov., 542; ²*Ibid.* 529; ³*Ibid.* 1923, June, 806; ⁴*Canad. Med. Assoc. Jour.* 1922, July-Aug., 570; ⁵*Brit. Med. Jour.* 1922, ii, 975; ⁶*Jour. Amer. Med. Assoc.* 1922, Aug. 19, 605.

DUODENAL ULCER. (See GASTRIC AND DUODENAL ULCER; STOMACH, SURGERY OF.)

DYSENTERY, AMŒBIC. (See AMŒBIASIS.)

DYSMENORRHOEA.

W. E. Fothersgill, M.D.

Dysmenorrhœa was the subject chosen for discussion at the British Congress of Obstetrics and Gynæcology¹ in April, 1923, and, in addition to the reports of this discussion, several papers have recently appeared. The difficulty is that the phenomena of dysmenorrhœa are subjective, and records of cases contain not observations, nor even evidence, so much as hearsay. The patient and her friends describe the phenomena before and after treatment; but there is no way of measuring pain, or of measuring the patient's power of putting up with it. Dr. Clow² talked to and questioned 1818 girls of from 11 to 25 years of age. At the first interview 70 per cent stated that they were free from menstrual troubles. This was before advice had been given. At the second interview, after an interval, this figure was raised to 93 per cent. Dr. Clow's conclusion was that if the customary restraint on activity of girls during menstruation were withdrawn, one generation would see the end of most of the cases of dysmenorrhœa. She was aware that severe spasmodic forms would not yield to mere hygienic treatment.

Meaker,³ considering dysmenorrhœa as an industrial problem, says that it accounts for a loss aggregating 1 per cent of the total time of female employees. Phillips⁴ quotes medical officers at girls' colleges who estimate the incidence of dysmenorrhœa at 5 per cent of the pupils; and factory medical officers who make it 15 to 25 per cent of the employees. In some factories three-fifths of the women employed lose time and seek advice for menstrual disorders, chiefly dysmenorrhœa.

Dr. J. S. Fairbairn¹ divided the medical attitude towards this disturbed function into a series with two extremes. There were those who always found kinks and twists and other mechanical deviations to explain it, and cured it by operating on what they found; at the other extreme were those who

regarded the disturbance as psychological. Between the 'kinkologists' and the psychologists came the ordinary people swinging from one side to the other as their fancy took them.

Most of the recent writers lose sight of the fact that patients describe two kinds of pain in connection with menstruation, some complaining of one, some of the other, and some of both. A few patients give such good descriptions of 'uterine colic' that it would surely be unwise to drop the classical term 'spasmodic dysmenorrhœa'. There are 'labour pains' and 'after pains' and 'menstrual pains', if we can be sure about any subjective phenomena at all. The majority of patients give good descriptions of dull pelvic aching which we associate with passive venous congestion, and the classical term 'congestive dysmenorrhœa' is certainly too useful to be thrown overboard. "It is a dull and obtuse mind that divides in order to distinguish, and a worse that distinguishes in order to divide." Still, classifications are useful to students and teachers. But most arrangements of the sufferers from dysmenorrhœa are cross-classifications, both useless and illogical. It must be remembered that of those who complain of menstrual pain (commonly congestive, rarely spasmodic, and sometimes mixed), many are perfectly healthy women in whom no pathological lesion or abnormality either of structure or of function can be ascertained by the ordinary methods of clinical investigation. They work and play, marry and may have ten children. They probably are more sensitive to stimuli than other people; in them ordinary uterine contractions or ordinary pelvic congestion enter consciousness in the form of griping pains and dull aching pain respectively. The fact that their tender part is in the head and not in the pelvis is no reason why they should not have appropriate treatment for their pain. The practical man, having completed his examination and found nothing wrong, will announce this fact to the patient and advise her to take as little notice of her periods as possible; but to follow her usual customs as to exercise, rest, hot baths, and diet. But he will not deny her the relief to be gained by the use of some medicine "to take the edge off her nerves" during the painful time. A **Bromide and Ammonia** mixture is still the favourite type for use in cases of 'congestive' pain.

For the cases of spasmodic pain, Dr. T. W. Eden¹ uses **Sulphate of Atropine**, given by mouth, in doses of $\frac{1}{100}$ gr. thrice daily for two or three days before the onset of the pain and during its continuance. The **Coal Tar Analgesics** are useful, and some authorities recommend **Benzyl Benzoate** 20 min. to 30 min. of a 20 per cent alcoholic solution suspended in mucilage, given every two or three hours while the pain lasts. Or,⁵ as an alternative: benzyl benzoate, 15 gr.; mucilage of acacia, 1 drachm; aromatic elixir, 1 oz.; in doses of $\frac{1}{2}$ to 2 drachms every two hours as required. The practitioner will remember that many of these patients with spasmodic pain say that their periods are painless after the birth of the first child, and that some say that they experience the same relief after they have had the cervix dilated under anaesthesia. He should also remember that after patients with congestive pain have been dilated and curetted, they generally go to another doctor and say they are worse. He should never forget that it is useless to dilate a cervix that has already been stretched by the passage of a child through it. So much for the dysmenorrhœa of healthy normal women.

Next, if the practitioner finds something wrong, it may be 'general'—anything from constipation onwards—and will receive appropriate treatment, in addition to one or other of the measures used for the temporary relief of pain which are available both in healthy and in unhealthy women.

Lastly, the practitioner may discover some local condition, perhaps a

developmental abnormality of the pelvic organs. His task then is to determine whether or not the abnormality is the cause of the dysmenorrhœa. Suppose he finds an 'under-developed' uterus, he is faced with the fact that there are plenty of cases of infantile uterus without dysmenorrhœa, and the same is true of the so-called cochleate uterus. Great stress has recently been laid¹ upon minor developmental errors as causes of dysmenorrhœa; and treatment by surgical and by organotherapeutic measures has been elaborated, some degree of success being claimed for both.

Injuries and mechanical lesions are not associated with much pain as a rule; but in certain cases of acquired retroversion, the position of the pelvic organs appears to produce passive venous congestion which is accentuated during certain phases of the menstrual cycle—a form of congestive dysmenorrhœa. If the right case is picked, surgical correction of the retroversion will no doubt relieve pain due to this cause.

Lesions which are the result of pelvic infection may often cause pain at the periods which is mentioned as a prominent symptom, and disappears after successful treatment of the pathological conditions present.

New growths occasionally cause dysmenorrhœa, which naturally is amenable to surgical treatment.

Thus, of all the cases in which there is a local pelvic lesion, those with minor developmental errors are the least satisfactory from the therapeutic point of view. It is probably best to ignore these lesions and treat the dysmenorrhœa just as if the woman were perfectly normal as to the pelvis.

REFERENCES.—¹*Jour. Obst. and Gynecol. Brit. Emp.* 1923, No. 2, 119, 226, and *Lancet*, 1923, i, 845; ²*Lancet*, 1923, i, 1161; ³*Boston Med. and Surg. Jour.* 1923, June 21, 1000; ⁴*Clin. Jour.* 1923, June 27, 303; ⁵*Lancet*, 1923, i, 814.

DYSPNŒA.

Dr. C. Lian.

(Translated by Carey F. Coombs, M.D., F.R.C.P.)

TREATMENT.—The intensive inhalation of pure oxygen which gives such good results in the immediate treatment of accidental asphyxia (coal gas, drowning, etc.) may also be applied clinically, and should be used in particular in dyspnœa of circulatory or respiratory origin, in infectious diseases of the lungs, and in cyanosis of every kind.

Apparatus.—The inadequate results achieved by the use of oxygen are largely due to the imperfections of the apparatus generally used. Barach and Woodwell¹ have used for these inhalations an apparatus in which the patient breathes into a closed chamber, the CO₂ being absorbed by the passage of the expired air over soda lime. Since a mask was not well borne by patients, these writers were led to use a kind of large mouthpiece, which was much more acceptable.

The writer and Navarre,² on their part, have used massive inhalations of oxygen, but with an apparatus by which the expired air is expelled, which is simpler and can be used by the patient himself. They employed a very simple mouthpiece comprising an oval part which is placed between the dental arches and the lips, completely obstructing the mouth, but allowing of movement of the jaw and tongue. This oval piece is pierced in its centre by an opening into a wide rubber tube ending in the double valve. The tube that encloses the double valve is made wholly of metal, and is sterilizable; at the one end it is attached to the mouthpiece, and at the other to the balloon. It allows the inspiration of oxygen from the balloon, while the expired air is expelled outside the apparatus. The rubber balloon, which holds 30 litres, is connected on the one hand with a valve, on the other with a tube of compressed oxygen. This apparatus, which includes a tube of compressed oxygen, a rubber gas-

bag, and a two-way valve and a mouthpiece, allows for a very long inhalation of large quantities of oxygen, without worrying or tiring the patient (see Figs. 30, 31).

Technique.—During inhalation, if the dyspnœa and cyanosis are so bad as to call for the administration of pure oxygen, the nostrils may be closed by small pads of cotton-wool soaked in glycerinated water. Usually, however, the patient is allowed to breathe both by mouth and nose, so that he inhales a mixture of air and oxygen. Respiratory exercises may be associated with the administration of oxygen if the doctor thinks fit, but this is usually limited either to emergencies or to convalescence. In serious cases the inhalations may continue for thirty minutes, separated by intervals of two hours, i.e., ten doses in twenty-four hours; in less severe cases two to four similar sèances a day. It is a good thing to allow the patient to apply the apparatus, so that he may be able to use it in case of emergencies, which gives him a sense of security and quells his fears.

Throughout the administration the oxygen should run quietly into the balloon, which should be kept half or a quarter full only. Usually the patient regulates this flow himself by means of a stop-cock with which the oxygen tube is provided. The quantity usefully inhaled in twenty-four hours varies from 200 to 1000 litres. To avoid the sensation of dryness of which some patients complain, a flask with two tubes, to hold about 1 litre half filled with water which may be flavoured with peppermint or other volatile oil, such as pine or eucalyptus, is interposed between the oxygen cylinder and the gas-bag.

Results.—Barach and Woodwell have treated pneumonia and cases of severe heart disease with success by their method, and have proved by analysis of the blood that its oxygen content is considerably raised thereby. The writer and Navarre have found this method very satisfactory in similar conditions, and have also used it for patients with persistent and tiring cough. The first inspiration of oxygen will stop the cough, which does not reappear until some time after the end of the inhalation, and decreases in frequency and intensity as the treatment progresses.

1 In the treatment of dyspnœa, if the appropriate apparatus cannot be used, oxygen may be given subcutaneously, either by an improvised apparatus, or with the oxygenator of Bayeux, or the hypodermo-oxygenator apparatus of Lian and Navarre.³

REFERENCES.—¹*Arch. of Internal Med.* 1921. ii, Oct. 15; ²*L'Hôpital*, 1923, April, No. 92 bis; ³*Ibid.* No. 93.

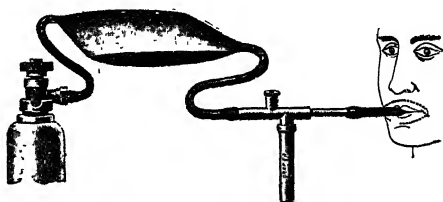


Fig. 30.—Pneumo-oxygénateur of Drs. C. Lian and P. Navarre for intensive oxygen inhalations. (Drapier, rue de Rivoli, Paris.)

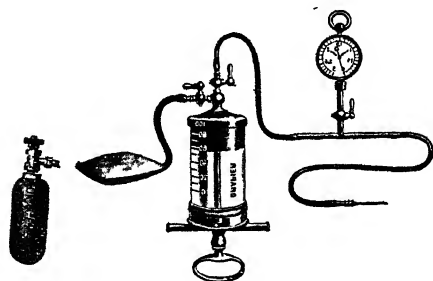


Fig. 31.—Drs. Lian and Navarre's hypodermo-oxygenateur for subcutaneous injections of oxygen. (Drapier, Paris.)

EAR, DISEASES OF.

A. J. M. Wright, M.B., F.R.C.S.

MIDDLE EAR AND MASTOID.

Scarlet Fever Otitis.—Suppurative otitis media frequently complicates scarlet fever, and, when it does occur, is apt to be severe in type. Owing to the fact that this disease is usually treated in isolation hospitals, skilled treatment is often not available in the early stages. It is at this stage that treatment is most valuable, and this fact is gradually being recognized by the appointment of an otologist to such hospitals. Gardiner¹ gives his experiences of two years' work as Otologist to the Edinburgh Infectious Diseases Hospital. Every case presenting ear symptoms was seen, and middle-ear suppuration was found to occur in 10 per cent of the cases of scarlet fever. This complication most frequently occurred during the first week. The symptoms produced were the usual ones of pain, fever, and discharge, the local appearance of the membrane, etc., presenting no unusual features. An effort was made at first to incise the membrane at the earliest possible moment, but this was later abandoned, owing to the fact that consent of the parents had to be obtained for the administration of an anæsthetic. The results, however, did not seem to be materially affected by this omission.

Mastoid Complications.—Of 300 cases of middle-ear suppuration, 7 per cent developed this complication. Only one case of meningitis occurred. Cases of mastoiditis were of two classes: those with acute pain, tenderness, cedema, and fever developing during the third week of the discharge; and those developing later, frequently without pain, tenderness, or fever. In this second class of case, much bone destruction was met with, with the formation of sequestra which delayed healing. Any adenoids were removed at the time of the operation on the mastoid.

Other Operative Treatment.—Tonsils and adenoids were removed as soon as the child was fit for operation. The effect of this proceeding on the ear condition was excellent, the average duration of discharge after this had been done being only fourteen days. Aural suppuration cleared up in all cases in which there had not been a previous chronic suppuration. Since this operation has been performed as a routine, the average stay in hospital on account of otorrhœa has been much reduced. The nasopharynx must be regarded as the primary seat of the infection in the otorrhœa of scarlet fever, and although the ear discharge associated with adenoids may cease for a time, it usually relapses, and it is these recurrent attacks of suppuration which are responsible for the extensive damage to the middle-ear structures so commonly met with after scarlet fever.

Zygomatic Mastoiditis.—This name is given to cases in which, in association with a middle-ear suppuration, an abscess forms in front of the ear instead of in the more common situation over the mastoid process. Mollison² estimates that these cases probably constitute about 2 per cent of mastoid abscesses. If thought of, the condition is not very difficult to diagnose. In the course of an otitis media, pain is felt in front of the ear, followed by a swelling in the temporal fossa, either in front of the pinna and above the temporo-mandibular joint, or somewhat further forward. Occasionally the swelling may be so far forward as to appear to be unconnected with the ear, and in such a case may be accompanied by cedema of the eyelids. There is pain and difficulty in opening the mouth, and tenderness over the root of the zygoma. Tenderness over the mastoid may be present or not. Discharge from the ear and deafness are usually present. This spread of the suppuration forwards may be due to infection of cells which, in such cases, are present in the outer attic wall and in the root of the zygoma. Sometimes, in the absence of such cells,

infection may spread forwards through the diploë. He concludes that cases of zygomatic mastoiditis give a definite clinical picture; that, to a great extent, the affection arises on account of the type of cell development in the temporal bone; and that, at mastoid operations, the outer attic wall should be explored to exclude such extensions forwards. There is some tendency to stenosis of the meatus after operation in these cases.

Mastoiditis due to *Streptococcus hæmolyticus*.—Dunlap³ claims that cases of mastoid inflammation due to this organism present certain characteristic features, as follows: There is an absence of mastoid tenderness and sagging of the posterior meatal wall, which signs are relatively constant in other cases. In the absence of operation, there is rapid and wide destruction of bone with abscess formation. Fever is absent before operation. The discharge is profuse and serous in character, this being probably the most characteristic sign. Only a moderate leucocytosis exists. On bacteriological examination, the organisms can usually be obtained in pure culture from the mastoid cavity. Although before operation fever is absent, in the post-operative stage there is as a rule a swinging temperature which gradually subsides.

MENINGITIS COMPLICATING OTITIS MEDIA.

The outlook in cases of septic meningitis secondary to suppuration in the middle ear is gradually becoming more hopeful owing to improvement in diagnosis and treatment. It is becoming apparent that, just as in cases of peritonitis there is a stage in which the condition is localized, so in cases of meningitis a similar stage exists which can frequently be recognized. Operation on cases in this stage holds out a considerable prospect of recovery. Jenkins⁴ has dealt very fully with this subject, and the matter is of such importance that his conclusions merit thorough consideration. For treatment to be successful, the disease must be diagnosed and treated at an early stage. With a few exceptions, cases in which organisms are present in the cerebrospinal fluid are fatal. It is necessary to recognize both the type of septic affection of the ear which is prone to cause meningitis, and the symptoms and signs that indicate the region of greatest intensity of the meningeal inflammation.

PATHOLOGY.—The resistance of the individual seems to be of more importance than the particular strain of organism. In the early stages, the advancing line of infection from the ear is successively outside the dura and arachnoid mater, but with inflammatory changes within them. There are thus, theoretically, two degrees of meningitis: one in which the organisms have not yet reached the internal surface of the arachnoid, and the other in which they have invaded the subarachnoid region. Probably both dura and arachnoid are resistant to the passage of infection. The examination of the cerebrospinal fluid should be considered in association with the clinical features, the character of the fluid at the region of maximum infection being not necessarily represented by the sample obtained on lumbar puncture. As regards the region of maximum intensity of the meningitis, cases should be considered in one of the three following groups:—

1. *Infection of the Middle Fossa.*—Owing to the fact that in this region there is an absence of large spaces or cisternæ in the subarachnoid space, the changes in the cerebrospinal fluid in the early and sometimes even in the late stages of infection may be relatively slight. Gross changes in the cerebrospinal fluid only occur when infection of the cisternæ has taken place. The path of infection, in all cases, is probably through the roof of the middle ear. The relative frequency of meningitis in this region in children suggests the importance of the petrosquamosal suture in the roof of the middle ear as the path for the spread of infection.

2. *Posterior Fossa Infection.*—Infection may occur by way of the labyrinth, through the posterior wall of the antrum, or secondary to a sinus thrombosis. In cases which were personally studied microscopically, infection had passed from the labyrinth to the meninges along either the auditory or facial nerves.

3. *Meningitis following Abscess of the Brain.*—A clear distinction should be made between a subarachnoid abscess and a brain abscess proper. The former is a localized meningitis, usually with changes in the cerebrospinal fluid and an abscess track leading to it from the middle ear. The latter has slight, if any, change in the cerebrospinal fluid, and, as a rule, no such track.

EARLY SYMPTOMS AND SIGNS IN RELATION TO THE SITE OF PRIMARY INFECTION.—The character of these depends on whether the primary infection has occurred in the cisternæ or in the trabeculated subarachnoid spaces, and on whether infection is in the posterior or middle fossa.

Primary infection of the cisterna pontis can only occur through the labyrinth. In all early cases that have been observed, the meningitis has followed closely on destruction of the labyrinth. In meningitis following extension from a labyrinth the seat of old infection, the meningeal inflammation is at a late stage when the patient first applies for treatment. This is explained by the fact that, in cases of acute septic labyrinthitis, the nausea, vomiting, and occipital pain lead to early medical attention. In labyrinthitis the cerebrospinal fluid is usually normal. The path of infection is probably via the internal auditory meatus, and possibly may remain for a short time localized to the subarachnoid spaces in this canal. The presence of labyrinthitis tends to obscure the meningeal symptoms, which are associated mainly with a rise of intracranial pressure, and consist of slight torpidity with irritability. Vomiting is common, but may be due to the labyrinth infection. The temperature is seldom higher than 100° or 101° . The pulse-rate, in the early stage, is usually relatively lower than the temperature. Headache is usually occipital and frontal, and bilateral. Sometimes distinct tenderness is present at the muscular insertions to the occiput, and these muscles gradually become rigid. Kernig's sign is usually present, and the knee-jerks are sluggish. If continuous subarachnoid drainage be now established, all these symptoms and signs will disappear, leaving only a local sepsis with labyrinthitis. The condition of the fundus seems to give some evidence of the progress of the case. A papilloedema is not present in early cases. The changes in the cerebrospinal fluid are turbidity, with an excess of cells, and a diminution of sugar, with the presence of globulin.

A primary affection of the trabeculated subarachnoid region spreads slowly, and symptoms are those of a local inflammation. Infection not being through the labyrinth, there are no labyrinthine symptoms to confuse. In the temporo-sphenoidal region, in early cases, the only symptom is a definite pain above the ear. A constant pain in this region in aural sepsis strongly suggests meningeal inflammation. Sometimes local tenderness on percussion is present, with irritability and a temperature of 101° to 102° , the pulse-rate showing a corresponding increase. If infection reaches the cisternæ, symptoms of a general meningitis supervene. The cerebrospinal fluid shows only slight changes until general diffusion occurs. These cases are often missed in the early stages, and headache with aural suppuration should be regarded with the greatest respect.

In the posterior fossa, this type of case is secondary to a lateral sinus thrombosis.

TREATMENT.—

Leptomeningitis.—Eradicate the local ear disease as completely as possible. This will cure cases in which the organisms have not invaded the subarachnoid

region. In doubtful cases, examine the cerebrospinal fluid twelve hours after clearing out the ear, to decide if further operation is necessary. Repeated lumbar puncture does not provide sufficiently effective drainage, the cerebrospinal fluid being an excellent medium for the growth of organisms. Drainage must be constant, and by puncture only a small quantity of fluid can be removed. The correct treatment is drainage at the site of maximum infection. As the condition in the early stages is local, treatment should be regional.

Early Affections of the Cistern Region.—The natural course of operation follows that of the primary infection through the labyrinth to the internal meatus. Prior to operation, 5 c.c. of cerebrospinal fluid are withdrawn slowly by lumbar puncture. This is immediately examined, and, as a result, a decision is made during the mastoid operation as to the extent of further operation. If the cerebrospinal fluid is normal, and if an acute labyrinthitis is present, a superior and inferior labyrinthotomy should be done. If the meninges are involved, drainage of the cisterna pontis by the internal meatus should be carried out. Rapid emaciation after operation is usual, probably due to the loss of sugar. This route of drainage is chosen because it follows the path of infection and the internal meatus forms a natural drainage tube.

Early Affections of Trabeculated Subarachnoid Spaces.—If in the temporo-sphenoidal region, a radical mastoid operation must be done to give free exposure. This is followed by the removal of bone upwards, and a careful search for septic tracks leading from the middle ear. The dura is opened, and the degree of drainage provided depends on the conditions found.

Later Stages of Leptomeningitis.—If, twenty-four hours after the labyrinthine drainage, changes in the cerebrospinal fluid show an advance of inflammation, free drainage of the cisterna pontis and basalis should be established. Irrigations upwards from a lumbar puncture may also be employed. The advantage of this method is that irrigation is carried out from healthy towards diseased regions.

In conclusion, the author emphasizes the necessity for the diagnosis of meningitis when early and localized, and reports eight successful cases.

Mygind⁵ also states that cases of aural meningitis are of two classes, one in which the condition spreads with extreme rapidity, and the other in which the spread is slow and removal of the local focus allows of resolution.

ARTIFICIAL EAR DRUM.

Although the use of the artificial ear drum is far from being new, there is no doubt that its value is not as widely recognized as it might be. Dundas Grant⁶ has emphasized this, and gives the following details for its use. Ideal cases are those with a high degree of deafness in which there is loss of a considerable portion of the tympanic membrane, especially in its postero-superior part. Complete dryness of the middle ear is desirable, but not essential. Any active inflammation, however, is a contra-indication. The artificial drum advised consists of a small pad of cotton-wool. It is introduced by means of short blunt-pointed toothless forceps. It is desirable that the first experimental application should be made by an aurist. When he has placed it as nearly as possible over the stapes, he tests the hearing by speaking softly and pressing on it with varying force and in different directions until he finds a spot the pressure on which is followed by improvement in hearing, as evidenced by the patient's ready replies. The patient has to be taught to introduce the appliance for himself or herself, and, if at all dexterous, soon learns to apply it on the spot of best hearing. With a little practice it becomes easy both to introduce it each morning and to remove it at night.

Description of Drum.—In view of the possible difficulty of removal and the unfortunate results which might follow its retention, he has devised a 'captive'

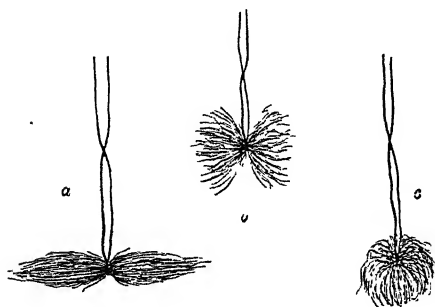


Fig. 32.—Artificial drum: three stages of preparation.
(Figs. 32, 33 redrawn from 'The Lancet'.)

artificial drum, which may be designated as safe. A small wisp of long-fibred absorbent cotton-wool is pulled into a point at each end, a piece of fine sewing cotton is tied round its middle, and the two ends of the thread are cut off at a little over an inch from the cotton-wool (Fig. 32, a). The fibres are now spread out radially like a star (Fig. 32, b). The tips of the radiating fibres are then turned in towards the centre so as to form a flat springy cushion the size of a pearl shirt-button (Fig. 32, c).

It is seized with the forceps at the spot where the thread is attached to the 'drum' (Fig. 33), dipped into parolein containing 1 gr. of menthol in the ounce, and finally inserted into the ear. The author strongly urges that no case of deafness, the sequel of perforative suppuration of the middle ear (the same is true of certain cases of relaxed membrane), should be dismissed as hopeless without a fair trial of this safe artificial drum or some equivalent.

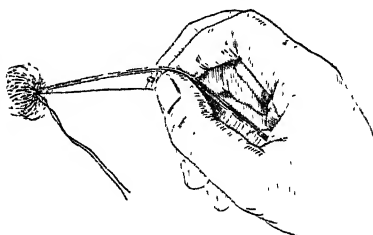


Fig. 33.—Artificial drum in readiness for insertion.

REFERENCES.—¹*Jour. of Laryngol. and Otol.* 1922, Oct., 497; ²*Ibid.* Nov., 545; ³*Laryngoscope*, 1922, Oct., 733; ⁴*Jour. of* 1922, Dec., 597; ⁵*Lancet*, 1922, ii, 1062.

Laryngol. and Otol. 1923, June, 304; ⁵*Ibid.*

ECZEMA, INFANTILE. (See SKIN DISEASE IN CHILDREN.)

ELECTROTHERAPEUTICS. (See also RADIOTHERAPY and X-RAY DIAGNOSIS.)

C. Thurstan Holland, Ch.M.

Diagnosis.—At the Congress of Radiology and Physiotherapy in London in 1922, Bourguignon¹ had a paper on the subject of the employment of electrical methods in the diagnosis and prognosis of *paralysis due to lesions of the peripheral nerves*. This is a long and important communication in which the author discusses fully his own work on the use of condensers and chronaxie. Asserting that the classical methods of measurement of excitability must be abandoned in favour of the methods of measurement by the chronaxie of Lapicque, he puts forward a technique which allows the chronaxie to be determined in man or in animals with precision. The ground covered by the paper is too extensive to be indicated in a short note, but those interested in the subject will find a great deal that is new, and a great deal that is valuable.

Ionic Medication.—Campbell² has carried out a series of experiments to test the ionic theory of medication, and the results obtained are: (1) The

amount of any drug introduced in an ionic state into the body by currents which can be used therapeutically is very small. (2) The drug, as soon as it is carried through the skin, is swept away in the blood-stream, and produces its specific action on the system generally; there is therefore no local concentration. (3) There is no evidence of deep penetration. In connection with this paper there is an editorial in the *British Medical Journal*² which sums up the whole question, quotes many authorities, and discusses alternative theories as to the mode of action of the constant current—the exact mode of action being unknown. That this current must have some beneficial action, particularly for the relief of pain in such diseases as sciatica, neuritis, and fibrositis, appears to be obvious.

Turrell¹ discusses the physiological action of current electricity, pointing out that a clear idea of this is necessary before it is possible to discuss any therapeutic action. This writer is always interesting, and his paper is full of material for thought. He summarizes his conclusions, and states that "after more than twenty years of drug therapy in a large general practice, it appears to me very strange that electrotherapists should prefer to explain the therapeutic action of the constant current upon the vague and uncertain action of drugs, hypothetically introduced to unascertained depths within the tissues, in unknown and unascertainable amounts, rather than upon the easily proved, the readily visualized, and the far-reaching effects of heat generation within the tissues". Two other papers of interest which bear on the same subject are by Challiol and Laquerrière,³ who discuss the action of the constant galvanic current on tissues in health and disease; and by Bourgnignon⁴ on the estimation of the iodine introduced and eliminated in ionization. In the latter paper the technique of treatment is described, and the methods of estimating the elimination of the iodine in the urine.

Diathermy.—Turrell,⁷ in a paper on treatment by diathermy, divides his subject into two parts: (1) The therapeutic effects of heat penetration; (2) The most effective means of securing this penetration with regard to safety, its regulation, and the possible methods of application. It is pointed out that although there are many methods of applying heat, there is only one by means of which heat can be directly applied throughout the body as a whole, etc., and this is by the electrical method known as diathermy. The author discusses in detail the mode of action and the medical and surgical applications. He concludes that the modern school of therapeutists may claim to have placed the high-frequency currents upon the firm and far-extending foundation of heat penetration, and to have secured for them an important and enduring position amongst the therapeutic methods of the future. Cumberbatch⁸ is of the opinion that much larger and more powerful machines are required than those now in use, as at present the machines have frequently to be used 'all out' at the maximum output, and then there is no reserve. In addition, there is much room for improvement as regards the spark-gap. The same author with Robinson,⁹ and the latter alone,¹⁰ have papers on the treatment of *gonorrhœal affections* by diathermy. In both these papers the subject is dealt with very fully, and many cases are reported as successfully treated. Very good results, in very bad cases, followed on the treatment of gonococcal arthritis; in orchitis and epididymitis pain and tenderness diminish or disappear after the first application, and in no class of cases have the results been so consistently good; the results of treatment in urethritis, endocervicitis, and prostatitis are also encouraging. In addition to its direct action on the gonococci, which are easily destroyed by heat, there are certain effects on the tissues which are prejudicial to the existence of these organisms. Humphris¹¹ advocates the use of diathermy in *high blood-pressure*. The blood-pressure is

lowered, and even when arteriosclerosis is present much benefit results. He describes his own apparatus and methods of application.

High-frequency Currents.—The physiological and therapeutic action of these currents as obtained by the aid of such apparatus as is commonly used in France are set forth by Ronneaux and Laquerrière.¹² Their paper is divided into sections under the headings of: (1) General application of medium tensions; (2) General applications of low tension and great quantity; (3) The physiological action of application of high tension; (4) The therapeutic application of currents of resonance or of high tension. Somerville¹³ describes his own experiences of the use of high-frequency currents, and quotes three cases to show the effect in tissue metabolism brought about by their use, measured by qualitative changes in the urine. He also discusses the effects of these currents on the surface temperature of the body.

Static Electricity.—This is the subject of a paper by Humphris,¹⁴ in which the static bath, the static wave current, the static induced current, the brush discharge, the static spark, and the high-potential vacuum are all reviewed. The indications for each are given, and the results to be looked for.

Hay Fever.—Marlin¹⁵ reports a rather remarkable result in a bad case of hay fever treated with the sinusoidal current applied to the spine. The indifferent pad was applied to the sacrum, and the active electrode, 1 in. in diameter, was held over the 7th cervical spine. Details of the applications are given, and apparently almost immediate relief was obtained. It is not claimed that the cure was permanent: only that the relief of distressing symptoms was marked. The suggestion is made that there was some action through the sympathetic nervous system.

Tungsten Light.—A paper by Woodbury¹⁶ is confined to the therapeutic results to be obtained by the tungsten filament electric lamp of from 60 to 100 watts and 110 volts. This paper deals with the colour of the light, and the therapeutic applications and the physiological action of light baths, concluding with the indications for the same.

Heliotherapy.—Axel Reyn¹⁷ has a valuable paper on treatment by artificial light, especially as regards *lupus* and other forms of *tuberculosis*. The first part of this paper deals with the experiments of Finsen and a description of the carbon arc-light lamps which are now used at the Finsen Institute to give light baths to take the place of sunlight. Some striking photographs of cases before and after treatment illustrate the remarkably good results which are obtainable. Those interested in this form of treatment will find the remarks on the kind of light which is most efficient of use, especially those in which the author contrasts the open carbon arc with the various forms of mercury-vapour arc light. The former can replace sunlight, and is much superior to the latter.

Electromagnetic Waves.—A paper on electromagnetic waves as a therapeutic agent—an appreciation of the electronic theory—is by Field,¹⁸ the director of the New York Radium Institute. He describes the apparatus, a special coil consisting of disc-like plaques measuring about 10 by 1½ in. each, made up of some 1700 feet of insulated copper wire. This coil, used single or multiple, is applied and regulated to permit the entire energy from a 110 alternating current, 60 cycles, to be brought in contact with the patient, at close or distant range. Cases which were treated are quoted, relief of pain being the most prominent result obtained.

REFERENCES.—¹*Arch. of Radiol. and Electrotherap.* 1922, Nov., 161, and Dec., 193; ²*Brit. Med. Jour.* 1923, i, 409; ³*Ibid.* 867; ⁴*Arch. of Radiol. and Electrotherap.* 1922, Oct., 130; ⁵*Ibid.* 135; ⁶*Ibid.* 139; ⁷*Brit. Med. Jour.* 1923, i, 143; ⁸*Ibid.* ii, 311; ⁹*Ibid.* 54; ¹⁰*Ibid.* 312; ¹¹*Ibid.* 314; ¹²*Arch. of Radiol. and Electrotherap.* 1922, Oct., 144; ¹³*Brit. Med. Jour.* 1922, ii, 557; ¹⁴*Ibid.* 555; ¹⁵*Ibid.* 1923, i, 971; ¹⁶*N.Y. Med. Jour.* 1922, 382; ¹⁷*Brit. Med. Jour.* 1923, ii, 499; ¹⁸*N.Y. Med. Jour.* 1923, 182.

ELEPHANTIASIS. (*See FILARIASIS.*)**EMBOLISM.***Sir W. I. de C. Wheeler, F.R.C.S.I.*

Key¹ believes that the removal of an embolus by means of arteriotomy is a satisfactory operation in many cases. There have been many attempts to remove a thrombus from an artery in order to restore the circulation and to prevent the development of gangrene. Key removed an embolus from the femoral, popliteal, axillary, and abdominal aorta arteries, on ten occasions in nine patients. The operation was performed from two hours to four days after the earliest symptoms. Gangrene appeared after four of the operations; in the other cases the results were good. A number of cases are collected from the literature, and in no instance has operation been fully successful when done more than twenty-four hours after the onset. The embolus is most often found in the position where a vessel divides. The symptoms may set in either suddenly, which is usual, or more slowly and stealthily. There is pain, a sensation of cold and disturbance of the sensibility, accompanied by change of colour of the skin, lowering of temperature, disturbed mobility, absence of skin and tendon reflexes, absence of pulsation. The diagnosis is seldom difficult, unless when the embolus is not entirely obstructive in the first instance. It is important to distinguish between an embolus, and a thrombus formed as the result of endarteritis. The localization may be difficult. Because of the collateral circulation, the circulatory disturbance will appear peripheral, and only at a distance greater or less from the embolus. The question of how long the blood-stream through the chief arteries to an extremity can be suspended by an embolus is of great importance, and has never been accurately estimated. There is no comparison between blockage of an artery by an embolus and the control of the circulation by means of a tourniquet. In the former case, the collateral circulation must be taken into account; in the latter there is none.

When operating, Key recommends the use of compresses dipped in 2 per cent solution of sodium citrate to prevent coagulation of the blood. From the time when the vessel is opened, instruments and gloves are rinsed in this solution. The curettes and probes used for removing the embolus are smeared with vaseline. It is better to open the artery immediately above the embolus when anatomically possible. Sometimes it is more convenient to incise below it. At times the embolus is so fragile that it goes to pieces when taken hold of, and has to be removed in many parts. When the embolus has been removed, the blood should be allowed to spurt out through the arteriotomy opening; should the blood run out only from the central end, we have an indication that the passage is not quite clear. The suture of the blood-vessels is performed with very fine vaselined silk, and clamps are used after the manner of Carrel's technique (*see MEDICAL ANNUAL, 1923, p. 499, Plate XXXVIII*).

In conclusion, Key states: An embolus which causes circulatory disturbance of a threatening character in the upper or lower extremities ought to be removed by arteriotomy unless there are contra-indications otherwise present. Moreover, the operation ought to take place as soon as possible. The localities chiefly affected in such cases are: bifurcatio aortæ, arteria femoralis communis, arteria iliaca communis, arteria poplitea, arteria axillaris, and the upper part of arteria brachialis. Partly to avoid the risk of secondary thrombus building, and partly not to incur a risk of injury to the intima, embolectomy ought, in his opinion, to come into consideration at an early stage, before the embolus in any of the above-named localities has produced threatening circulatory disturbance; so soon, indeed, as the symptoms are sufficiently clear for the diagnosis to be formed, and threatening symptoms need not be expected.

If gangrene has already begun to appear, it may, in certain cases, be indicated that, through attempting to improve the circulation by embolectomy, the line of demarcation may move further peripherally, and thus a smaller section will require amputation.

As the embolus suitable for operation is far from rare, it is of moment that practising medical men learn to diagnose it in time, and that they immediately consult a surgeon or send the case to the surgical department of a hospital. If, on account of local circumstances, this cannot be done, or if the operation be contra-indicated because of the patient's general condition, the action of the heart, or the condition of the vessel, an attempt should be made, in an early and suitable case, to crush the embolus by massage.

[Few surgeons will agree with the advice given in the last sentence, but Key has drawn attention to a very important surgical matter.—W. I. de C. W.]

Bull² discusses *embolic gangrene of the extremities*. A patient, young or old, suffering from cardiac defect, or in the first stage of convalescence after acute infectious illness, is suddenly seized with severe pain in one or both legs. At the same time, or in the course of a few hours, he notices a diminution of sensation, the leg becomes white and cold, and muscle function is decreased so that soon the leg cannot be moved. The pulse in the chief artery is either absent or very much weaker than that on the other side; often distention can be felt in the artery, and above this point the pulse is normal. If the embolus is situated at the bifurcation of the aorta, there will be pain also in the back and the stomach, in addition to bladder symptoms in the form of incontinence and hæmaturia. From his study of autopsy reports the author has found that by no means all cases of blocking of the aorta lead to gangrene of the lower extremities; collateral circulation is more easily established here than further down. If gangrene has developed, the seat of the embolus responsible must be sought considerably above the line of demarcation. In gangrene of the foot and lower third of the leg, it is located in the popliteal artery; if the gangrene extends as far as the upper third of the leg, it is in the femoral artery; in gangrene of the thigh, it is in the iliac artery or the aorta. Bull thinks that not more than ten hours should elapse before an attempt is made to remove the embolus. After suturing the vessels, one must be quite sure that the pulse has returned at the periphery. He recommends the citrate solution used by Key during the operation.

Buerger³ reports two cases illustrating the *operative treatment of embolism*. It is urged in this communication that the removal of the embolus should be entertained very early, as secondary obliterative changes take place when the lumen of the vessel becomes blocked.

Wharton and Pierson⁴ draw attention to the *minor forms of pulmonary embolism after abdominal operations*. They quote De Quervain, of Switzerland, as saying that three-fourths of the true post-operative deaths following operations upon the stomach are due to lung complications—emboli, pneumonia, and lung gangrene—and they state that, in a good share of the cases of so-called pneumonia, the processes are really embolic in nature.

Fixity of the diaphragm either after or before operations in cases of the acute upper abdomen produces œdema of one or both lungs, and in consequence fine pulmonary crepitations can be heard at the base. These crepitations must not be mistaken for either fat embolism or any other form of emboli, or for commencing pneumonia with reflex abdominal rigidity. In fact, any condition which prevents free descent of the diaphragm may cause œdema of the lung with crepitations, rise of temperature, and expectoration, sometimes blood-stained. The condition is perhaps most often seen in gall-bladder cases, and is sometimes an early sign of acute gall-bladder obstructions and infections.

All surgeons are familiar with grave pulmonary embolism causing more or less complete occlusion of the pulmonary artery and cutting off the circulation of more than one lobe, terminating fatally in 90 per cent of the cases. Moderate-sized emboli, causing pulmonary infarction from blockage of the smaller vessels, cause death in from 15 to 20 per cent. [In a recent case of the reviewer's, following the radical cure of inguinal hernia, the temperature of the patient rose in the second week, accompanied by crepitations, dyspnoea, and blood-stained expectoration. These signs cleared up after a few days, to be followed again by similar symptoms from detachment of emboli, until finally there was sudden death from complete occlusion of one of the pulmonary arteries. The case illustrates that pulmonary infarction from occlusion of smaller vessels may be followed by grave pulmonary embolism from blockage of the pulmonary artery. Very small emboli may cause incomplete infarction and produce a mild course of symptoms; there are no deaths in cases of this group.—W. I. de C. W.] In this connection, the writers of the paper state that, in a previous communication, they reported the cases of four patients who developed grave pulmonary embolism after they had recovered from previous minor attacks. In the last two years they have been fortunate in that none of their patients who have had minor embolic complications have died later in more severe attacks.

The mortality in cases of pulmonary infarction which occur in the first week after operation is 50 per cent. The writers point out that X rays are valuable as a diagnostic agent, and come to the following conclusions: Embolism in its various forms is the cause of fully 50 per cent of the noteworthy pulmonary complications that occur after gynaecological and abdominal operations. Almost half of the deaths that have occurred after gynaecological operations have been due to pulmonary embolism. Of the various forms of post-operative pulmonary embolism, pulmonary infarction is the most common, and until very recently was hardly ever recognized as an embolic manifestation. Pulmonary infarction usually presents a characteristic clinical and pathological picture, and should be diagnosed. The mortality in pulmonary infarction is between 15 and 20 per cent. Any conditions that cause feebleness of the circulation, pulmonary stasis, or congestion, not only favour the occurrence of pulmonary infarction, but also increase the gravity of the complication. Any measures, therefore, which increase the efficiency of the pulmonary circulation tend to minimize the seriousness of this lesion. They believe that pneumonia can be almost eliminated as a cause of death after gynaecological operations. Our ability to prevent pulmonary embolism, however, depends upon our ability to prevent post-operative venous thrombosis and phlebitis, a problem which is still largely unsolved. In the diagnosis of pulmonary complications the Röntgen ray has been of invaluable aid. In pulmonary infarction they have been able by this means to establish the presence of lesions which have failed to develop characteristic physical signs (*see also* MEDICAL ANNUAL, 1923, p. 438).

Fat Embolism.—Sutton⁵ deals with the question of *pulmonary fat embolism*. He states that it is at least a potential factor in the cause of death following any operation in which fatty tissue has been injured. He draws attention to the two types of symptoms, pulmonary and cerebral. They may appear singly or in combination. In one case, respiratory symptoms actually commenced during the operation. The temperature is usually elevated, often suddenly, just before death. If the fat passes through the pulmonary system, the central nervous system may receive an overwhelming amount in the form of emboli, producing restlessness, mental dullness, stupor, and delirium. Tremor, convulsions, and paralysis have been reported. When the cerebral symptoms

are predominant, the condition is often confounded with delirium tremens. Helpful aids to the diagnosis of fat embolism are the discovery of pulmonary œdema, small petechial hæmorrhages in the skin over the chest, and blood-stained sputum containing numerous fat droplets. This last sign is important. The droplets have been found on the second day after injury. Globules of fat may be present in the urine; they can be detected on the surface if the urine is held up to the light.

With regard to treatment, broken bones should, of course, be kept absolutely at rest; complete hæmostasis is important. Active treatment has not met with much success. Normal saline injected into the veins has been recommended. Cardiac stimulants and heat should be applied to get the blood flowing at as high a rate as can be maintained.

Sutton states that death from pulmonary fat embolism is fairly rapid, generally on the first, second, or third day after operation. He gives a table of 16 cases in which death occurred. A positive diagnosis was made in 4 cases. Pulmonary fat embolism, he states, should be taken into consideration as a complication in any surgical case in which there is an injury of fatty tissue, and in which there are symptoms of cyanosis, rapid or laboured respiration, elevated temperature, and an increased pulse with a low tension. The sputum and urine should be investigated for fat.

[If Sutton's inferences are correct, death by fat embolism has not been recognized by most surgeons, and it would be interesting to investigate the presence or absence of fat droplets in the capillaries of the lung, in the urine, and in the sputum, in cases where death obviously resulted from some other pathological condition following injury or operation.—W. I. de C. W.]

REFERENCES.—¹*Surg. Gynecol. and Obst.* 1923, March, 309; ²*Ibid.* 1922, Dec., 427 (abstr.); ³*Ibid.* 1923, April, 463; ⁴*Jour. Amer. Med. Assoc.* 1922, Dec. 2, 1904; ⁵*Ann. of Surg.* 1922, Nov., 501.

EMPHYEMA.

Sir W. I. de C. Wheeler, F.R.C.S.I.

Hippocrates made frequent mention of empyemata in his writings, and referred both to cavities within the lung containing pus, and to empyema as it is understood to-day. Pus in the chest cavity may be caused by a great variety of organisms, either primary or secondary, including metastatic infection by the gonococcus and the typhoid bacillus, the pneumococci and streptococci being of course comparatively common. The presence of diphtheria bacilli has been reported in a number of cases. In the chronic cases, in addition to the hæmolytic cocci, *B. pyocyaneus* was constantly found. In civil practice the pneumococcus occurs twice as frequently as the streptococcus.

In deciding upon operative treatment, it should be remembered that the cavity containing the pus must either (1) become obliterated by the expansion of the lung, (2) be obliterated by removal of overlying ribs and subsequent collapse of the other tissues of the chest wall—i.e., the old Estlander operation, or (3) be sterilized by the use of Carrel tubes, and remain quiescent or become gradually obliterated in the course of time. (4) In some cases the injection of Beck's paste after sterilization of the cavity brings about rapid closure of the sinus.

In the early acute cases, aspiration or air-tight drainage, which will be described later, allows of expansion of the lung in the course of a short time. In chronic cases, to get early obliteration of the cavity, it is necessary to decorticate the lung to allow of expansion. In the case of tuberculous empyema, surgery is unsatisfactory, as it usually produces secondary infection of the chest cavity; furthermore, the tuberculous empyema is a complication of pulmonary tuberculosis, and the prognosis is, of necessity, bad. Whatever

operation is performed in a case of empyema, the line of incision should be directed by a previous X-ray examination.

Eggers¹ discusses the *management of various groups of chronic cases*.

When an empyema cavity communicates with the outside by a narrow sinus, but nevertheless is inadequately drained, treatment is by a radical extirpation

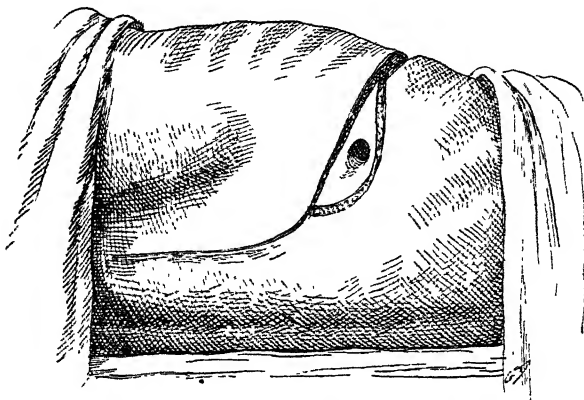


Fig 34.—Empyema: line of incision in a typical case.

(Figs. 34-37 are redrawn from the 'Annals of Surgery'.)

of the entire fistula together with all surrounding tissue, until a large opening into the cavity is obtained; this often necessitates the resection of a small portion of from two to four ribs. After this, Carrel tubes are inserted together with a large outlet tube, and muscles and skin partly closed. When steriliza-

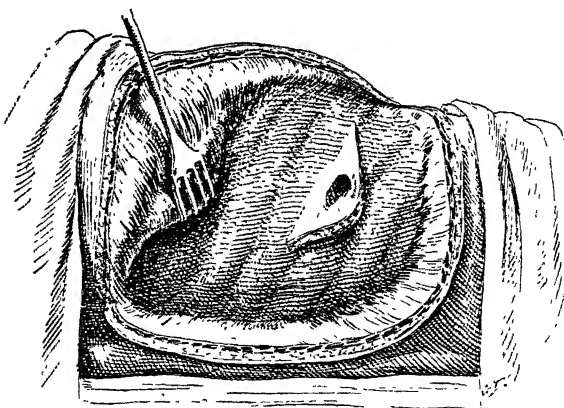


Fig. 35.—Muscles and skin pushed back, exposing ribs.

tion is obtained, the cavity is allowed to close. All the cases recorded did well; the time necessary for healing was from one to three months.

Cases with a rigid empyema cavity having infected walls, or with pockets and recesses, are treated more radically. Most cavities and sinuses run up

posteriorly, and in a typical case the incision is therefore so placed that its upper end will correspond with the upper end of the cavity. The incision runs behind from the upper border of the cavity downwards and forwards, encircling the scar and opening, to the lower portion of the cavity (*Fig. 34*). After division of the muscles the bony chest wall is exposed (*Fig. 35*). Portions

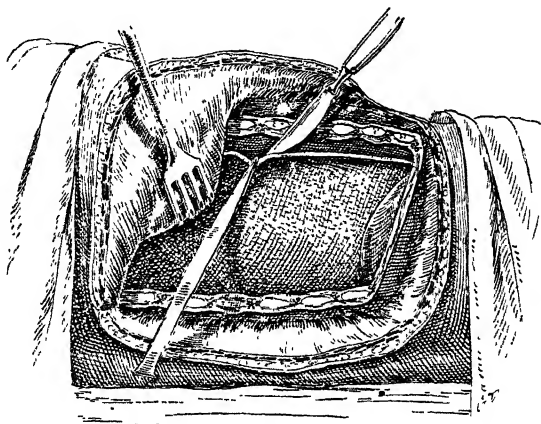


Fig. 36.—Outer wall removed; dissection of angle of reflection of pleura being started.

of the ribs overlying the cavity are removed. An endeavour should be made to remove the fused and thickened ribs with the intervening infected tissue and fistula in one piece. The object of the operation is not to bring about collapse of the chest wall, but simply to mobilize it; for this reason it is

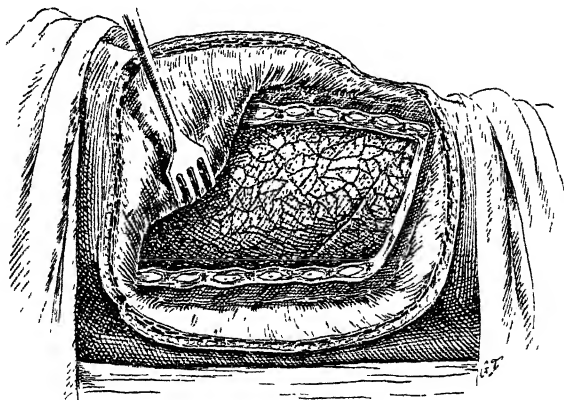


Fig. 37.—Lung completely decorticated and expanded. Wound ready for closure.

necessary to remove but short pieces of ribs. The intervening intercostal tissues are usually infected, but, in any event, to obtain good exposure they should be removed. The outer wall of the cavity is now exposed and should be split open. It is composed of the parietal pleura greatly thickened; it is firm, and cuts like cartilage. This wall is entirely removed, exposing the floor

of the cavity. Recesses and pockets are now searched for, and must be completely extirpated. Inspection of the floor of the cavity shows almost absolute immobility of the lung. The removal of the dense connective tissue holding down the lung is now commenced; the connective tissue must be dissected off with a sharp knife from the visceral pleura, as shown in the illustration, until decortication of the lung is complete (*Figs. 36, 37*). This is very easy in some cases, very difficult in others. Free criss-cross incisions may be made if the tissue cannot be removed. Even after years of compression the lung is capable of expansion. At this stage it is an advantage to reduce the anæsthesia, and to allow the patient to cough or strain by irritating the back of the throat with a spatula. Sometimes expansion is poor owing to fibrosis of the lung itself.

Empyema in Young Children.—Many mistakes in diagnosis will be avoided, and early treatment instituted, if the aphorism, which Dr. T. G. Moorhead, of Dublin, lays stress upon, is constantly kept in mind: "All cases of unresolved pneumonia in children are cases of undiagnosed empyemata." There is a mortality of over 70 per cent amongst children suffering from empyema in the first year of life. All the physical signs may point to a bronchopneumonia, and the picture

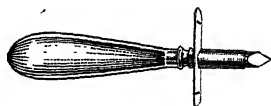


Fig. 38.—Poynton and Reynolds' trocar and cannula for empyemata in children.



Fig. 39.—The cannula in position. Rubber tube stretched on a rod introduced through cannula.

of tuberculosis is often closely mimicked: X rays may fail to show the presence of pus. For these reasons, the early employment of an exploring needle is essential. With early diagnosis and efficient treatment, infants suffering from empyema should be saved.

The writer employs simple aspiration at first, and occasionally this will result in cure; but as a rule the evacuation is insufficient and the results are unsatisfactory. The same suction drainage is employed in empyemata in children as in adults, but in the case of young children the method recommended by Poynton and Reynolds has been employed for some time with very satisfactory results. The trocar and cannula designed by Dr. Poynton and Mr. Reynolds is inserted at a point where pus was previously found with the needle (*Fig. 38*). A rubber tube

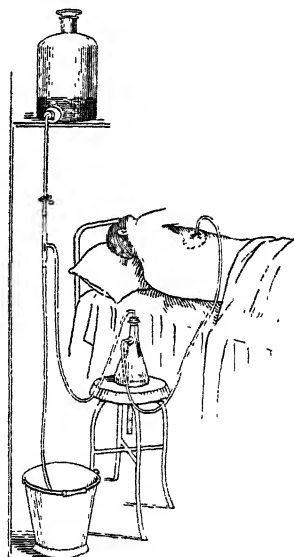


Fig. 40.—Suction pump in position. In this case the 'rubber glove' method of air-tight drainage is used. The pump is also employed with Reynolds and Poynton's cannula.

tied at the end and with a lateral hole (*Fig. 39*) is stretched on a rod, and passed through the cannula so as to make an air-tight fit. Suction bottles are then attached, after the fashion of Sprengel's water-drip pump (*Fig. 40*). In the adult the same arrangement is used, but instead of the cannula, a rubber tube is inserted after resection of a rib, and fixed in position by the glove-finger or finger-stall method. (*See MEDICAL ANNUAL, 1922, p. 456, Fig. 82.*) These arrangements avoid the opening of the pleural cavity to the chances of a secondary infection, with possibly a resulting sinus. They do away with the necessity for frequent dressings, and there is little or no danger of skin infection. The expansion of the lung is accelerated. Whenever a drainage tube comes through the skin, whether in gall-bladder cases, urinary bladder cases,

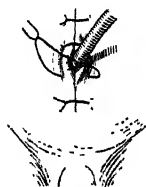


Fig. 41.—The skin round drainage tubes in the chest and elsewhere should be infolded so that the raw edges do not press on the tube.

or for the drainage of pus elsewhere, the skin is sutured round the tube in the manner illustrated (*Fig. 41*). It is a small but very useful part of the drainage operation for emphyema. The raw edges of the skin in this way are not in contact with the tube; there is no subsequent ulceration, and no pain and discomfort. In early cases in children, when Poynton and Reynolds' apparatus is used, there is a gradual emptying of the pleural cavity, and a corresponding gradual expansion of the lung. In later cases it may become necessary to do a rib resection and to free the adherent lung before expansion takes place. As an alternative, an excision may be made between the ribs, the pus allowed to escape, and a flat piece of rubber tissue inserted as a drain for the first twenty-four hours. After removal of the drain the pleura can, in certain cases, deal with any further collection. The treatment will, of

course, be guided by the nature of the organism present.

Beye² reports four cases of *opening the peritoneum in operations for emphyema*. He states that drainage should be obtained in the most dependent portion of an emphyema, acute or chronic. When the emphyema rests on the diaphragm, there is a certain danger of opening the peritoneal cavity either through or below the diaphragm. Localization of the pus by the aspirating needle at the beginning of the operation, and again after resecting a rib before incising into the emphyema, will obviate the danger of opening the peritoneum.

REFERENCES.—¹*Ann. of Surg.* 1923, March, 327; ²*Jour. Amer. Med. Assoc.* 1923, April 21, 117.

ENCEPHALITIS, EPIDEMIC. (*See also MENTAL DISEASES—PSYCHIC SYMPTOMS IN EPIDEMIC ENCEPHALITIS.*)

Sir James Purves-Stewart, K.C.M.G., C.B., F.R.C.P.

The annual report for the year 1921 of the chief medical officer of the Ministry of Health shows a progressive increase in the number of cases of lethargic encephalitis notified during the last three years, viz., 1470 in 1921, as compared with 844 in 1920, and 524 in 1919. Part of this increase is doubtless accounted for by increased skill on the part of medical practitioners in the recognition of the disease; 82 per cent of the cases were in urban districts, and 15.1 per cent of the total cases for the country were in London. As in preceding years, the majority of cases occurred during the first quarter of the year. There was no repetition of the 'summer rise' which had been noted in 1920. It would appear as if the disease had spent its epidemic force during the winter of 1920-1, and there also seemed reason to think that it had become less malignant in its clinical manifestations. An interesting fact emerges from the statistics of the disease in Poland as recorded by Sterling,¹ viz., that out

of 1374 cases notified, 848 were Christians and 526 Jews. This high incidence of the disease among the Jews is remarkable, as the proportion of the Jewish population in Poland does not exceed 14 per cent. It affords further evidence as to the predisposition of the Hebrew race to certain diseases of the nervous system, as already exemplified in other maladies, such as the Tay-Sachs type of amaurotic family idiocy, torsion-spasm, etc. In America, according to Pearl,² of Johns Hopkins University, the case-incidence of epidemic encephalitis in 1920 in New York City was nearly five times that in 1919. At the same time the mortality-rate increased from 26 per cent to 37 per cent.

ETIOLOGY.—The etiology of epidemic encephalitis is not yet established securely, although there is much in favour of the 'globoid bodies' described by Loewe and Strauss³ as the causal organism. Most observers agree that the disease is caused by a microbe having a minute filtrable form, which permits transmission to animals by means of the filtrable virus. It seems probable that the virus exists in the nasopharynx, that the disease is mildly contagious, and that the usual period of incubation is about ten days. The theory that the disease is caused by a specialized, highly neurotropic, influenza virus is singularly deficient of proof.

SYMPTOMATOLOGY.—The clinical features of the disease are now well recognized. The essential symptoms are the prominent *diurnal drowsiness*, often associated with *insomnia at night time*; transient *cranial nerve palsies*, especially affecting the ocular nuclei. To these may be superadded, either during the acute phase of the malady, or more commonly afterwards, *extrapyramidal motor disturbances* such as myoclonus (an ominous symptom), choreo-athetotic movements, or paralysis agitans of rapid onset. *Shooting pains* in the limbs and trunk often precede the grave myoclonic form of the disease. But the encephalitic symptoms are so polymorphic that almost any focal symptom may develop. A *labyrinthine variety*, with paroxysmal vertigo, nystagmus, and ataxia, has been described by Barré and Reys,⁴ whilst various writers, notably Delater and Rouquier,⁵ have noted a form characterized by almost exclusively *psychical symptoms*, with delirium, hallucinations, confusion, and mental disturbances, usually worse at night. These are classed under the name of acute delirium. In such cases the diagnosis can only be established by the subsequent development of acute transient nuclear symptoms, myoclonus, or neuralgic pains. Müller,⁶ of Marburg, draws attention to the increased frequency of cases of so-called '*rheumatic facial palsy*' since the appearance of epidemic encephalitis, and maintains that many of these are abortive forms of an infective nervous malady principally affecting the facial nucleus in the pons. *Optic neuritis* or *atrophy* occurs, although rarely—in about 5.5 per cent of cases, according to Parsons'⁷ report to the Ministry of Health. If every case were examined ophthalmoscopically, it seems probable that this proportion would be somewhat higher. The *ocular symptoms* are usually transient, but now and then the symptoms last for months or even a couple of years. Various *respiratory disturbances* are not uncommon, especially in children, notably transient or persistent rapidity of breathing (tachypnoea), spasmodic cough, resembling pertussis but without expectoration or prolonged inspiration, respiratory tics (puffing, panting, sniffing, etc.), and, commonest of all, *epidemic hiccup*, in which the myoclonic spasms may not only affect the diaphragm but may even extend to the muscles of the abdominal wall and trunk, unilaterally or bilaterally. Numerous observations on the *cerebrospinal fluid* have established that in epidemic encephalitis the most notable abnormalities in the fluid are an increase in its sugar content (thereby contrasting with all forms of meningitis, in which the sugar is diminished or absent), the presence of a luetic gold-curve, increase of globulin, and a moderate lymphocytosis.

Of equal interest with the symptoms during the acute phase of the malady is the surprising array of *post-encephalitic sequelæ or residua*. Sometimes we meet with a chronic progressive form of the disease. There is always, unfortunately, the possibility of the development, after a free interval of months or years, of a progressive 'para-encephalitic' disease, analogous to the late manifestations of syphilis. This is usually of a Parkinsonian type, and there are few sadder pictures than that of a young child with the symptoms of *paralysis agitans*, following an apparently mild attack of epidemic encephalitis. Masci,⁸ of Rome, draws attention to a remarkable phenomenon sometimes observed in the post-encephalitic variety of paralysis agitans, which consists in the fact that the patient who is barely able to walk may have no difficulty in running. This sign had previously been observed by Tilney, who gave it the name of '*metadromic progression*', and by Souques, who called it '*paradoxical movement*'. Other residual phenomena include *choreo-athetoid* movements, *torsion-spasm*, *hemiparesis* due to unilateral pyramidal lesions, and even definite *psychoses*, the most serious of which is dementia præcox. Short of this, however, as Hall⁹ has pointed out in his Lumleian lectures, *moral changes* are specially frequent in juvenile patients. "The good child becomes a naughty child, the clever child a dunce". The child becomes restless, irritable, with paroxysms of rage, cruelty, greediness, aggressive behaviour, and sometimes exhibits morbid sexual tendencies. Nocturnal excitement in children is a common residuum. Towards evening, sometimes with remarkable punctuality, a change comes over the child, who becomes restless, excitable, and unmanageable. At bed-time this is still worse, and there is no suggestion of sleepiness. The child may sing, whistle, or make queer noises, get out of bed, and run about until the morning is well advanced. He then falls into a heavy sleep which may last till mid-day. This so-called *inversion of the sleep-rhythm* is not merely an alteration in the hours of sleep. There is a definite mental excitement, recurring every evening, and continuing through the night until the nervous centres are exhausted and the patient falls asleep.

PROGNOSIS.—The more one studies these cases, the more does one become impressed by the fact that complete and rapid recovery is uncommon, except in the very mildest cases.

The mortality of epidemic encephalitis varies in different epidemics. It has been estimated as low as 10 per cent, and as high as 40 or even 50 per cent. The acute myoclonic type is nearly always fatal. These figures refer to the acute phase of the disease. In the chronic stage the danger to life is much less, but prognosis is unfavourable owing to the persistence of symptoms which interfere with the patient's powers of locomotion. Paralysis agitans is the most frequent sequela, and one of the most intractable. Bing and Stähelin,¹⁰ of Basel, from a study of 97 cases from which early fatal cases were excluded, came to the following conclusions: (1) Pure epidemic hiccough clears up completely without residual symptoms. (2) Other rudimentary forms, in which lethargy, chorea, and myoclonus are absent, are not so completely harmless as pure hiccup, but appear to end in complete recovery also. (3) Lethargic forms, with or without myoclonic or choreic movements, clear up completely in about a quarter of the cases; in about half the cases paralysis agitans supervenes, sooner or later; in a minority of cases the Parkinsonian symptoms do not appear until after an interval of six, nine, or even twelve months after the original acute attack. (4) Pure choreic forms have a relatively favourable prognosis, as the writers have never seen paralysis agitans develop in such cases. (5) The myoclonic forms are more serious than the choreic; pure myoclonic encephalitis may pass on into paralysis agitans. (6) Post-encephalitic paralysis agitans may clear up, but this is exceptional, and apparently only

occurs in cases in which the symptoms are not of late onset. (7) The mortality of epidemic encephalitis, after excluding pure hiccup and other rudimentary forms, is about 20 per cent. Death in late cases may be due to febrile complications or to suicide from mental depression.

TREATMENT.—Numerous drugs have been recommended for the treatment of epidemic encephalitis. Economo¹¹ has only found two which have a favourable influence during the acute phase of the disease, viz., urotropine and Pregl's iodine solution. Urotropine should be given in large doses of 60 to 120 gr. at a time, intravenously for four or five successive days, and subsequently by the mouth. Pregl's Iodine Solution should be given intravenously in doses of 10 c.c. the first day, 25 c.c. the second day, 50 c.c. the third day, 100 c.c. the fifth day, and then 100 c.c. two or three times a week, until a total amount of 800 c.c. has been given. Piticariu,¹² of Roumania, treated three cases of myoclonic encephalitis and one of paralysis agitans by intravenous injection of the patient's own Cerebrospinal Fluid, the injections being given in doses of 10 c.c. every five to seven days. Shortly after the first injection a considerable improvement was observed, and the symptoms subsequently completely, or almost completely, disappeared. Ross Moore,¹³ on the other hand, treated a group of 8 cases by intraspinal injection of their own Blood Serum. The average amount of serum injected, after withdrawal of a corresponding volume of cerebrospinal fluid, was 30 c.c.; the injections were repeated at intervals of 4 to 20 days, depending on the effects noted after each injection. In 5 cases he noted temporary improvement, but all of them were chronic cases and therefore likely to be associated with permanent destructive lesions.

As in the ordinary degenerative or pre-senile form of paralysis agitans, Scopolamine or Hyoscyne Hydrobromide, hypodermically or by the mouth, often has a marked palliative effect. These may be usefully combined or alternated with Gelsemium. Good results are also recorded by an intensive course of intramuscular injections of Sodium Cacodylate, 6 or 7 gr. daily for a week.

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ENCEPHALITIS HÆMORRHAGICA FOLLOWING ARSENOBENZOL MEDICATION.

Sir James Purves-Stewart, K.C.M.G., C.B., F.R.C.P.

The Medical Research Council¹ have published a valuable report on certain sequelæ of arsenobenzol medication, which is of special interest to neurologists. No special arsenobenzol preparation can be regarded as more likely than others to produce ill effects. Nor can errors in technique account for more than a few accidents. The most important ill effects which may end fatally are encephalitis hæmorrhagica, acute yellow atrophy of the liver, and exfoliative dermatitis and its complications. Of these the first-named appears to have been the most frequently observed in Germany, whereas in England and America the second and third are more frequently recorded. About half the total recorded 'salvarsan deaths' have been due to encephalitis.

SYMPTOMS.—These appear from two to five days after injection, and, for the most part, end fatally within twenty-four to forty-eight hours. The majority of cases occur after the second injection. The illness is ushered in by intense headache, shivering, vomiting, and sometimes by fever. On the following day

the patient suddenly has an epileptiform convulsion followed by unconsciousness, with absent deep reflexes, extensor plantar responses, and sometimes ocular palsies. The coma, with intercurrent epileptiform convulsions, continues till death.

ETIOLOGY.—Two views have been expressed as to the causation of this condition: that it is an acute cerebral syphilis of the nature of a 'Herxheimer reaction'; or that it is a direct result of salvarsan poisoning, probably in susceptible persons. The bulk of evidence supports the latter view.

PATHOLOGICAL ANATOMY.—The morbid anatomy of the condition is specially described by Marschalko and Vespremi. Macroscopically, hæmorrhages were seen in various parts of the brain, sometimes punctiform, sometimes larger. They are specially frequent in the pons. Microscopically, capillary thromboses and hæmorrhages were the characteristic lesions.

PROGNOSIS.—A few cases are recorded of encephalitic symptoms with recovery.

TREATMENT.—The committee suggests **Bleeding** up to 18 or 20 oz., the withdrawal of 15 c.c. of **Cerebrospinal Fluid** by lumbar puncture, and intramuscular injections of 1·5 c.c. of 1-1000 **Adrenalin**. All these measures should be carried out as early as possible after the onset of symptoms.

REFERENCE.—¹*Medical Research Council Special Report Series*, 1922, No. 66.

ENDOCARDITIS LENTA.

Drs. C. Lian and L. Pollet.

(Translated by Carey F. Coombs, M.D., F.R.C.P.)

Malignant endocarditis¹ of a slow course, for a long time regarded as rare, is really not uncommon. All writers treat of it as ending always, or almost always, in death, since there are so few recorded instances of recovery. There is, however, a possibility of recovery, as a recent paper by Libman² shows.

Evolution towards Recovery.—In 150 cases of subacute malignant endocarditis seen by him in which the blood culture was positive, he has noted 4 cases of recovery, lasting respectively for nine, seven, five, and five years. To this may be added 2 others, one of which began in 1921 and the other only a few months ago. As proof of his diagnosis, he is not content with the co-existence of a valvular lesion and the presence of *Streptococcus viridans* in the blood. In his cases there were also characteristic signs such as fever, splenomegaly, petechiæ, Osler's painful nodes, painless hæmorrhagic nodules of Janeway, embolism, and progressive anæmia.

Relapsing Forms.—Sometimes the recovery is only apparent. Libman quotes 4 cases where the subacute endocarditis appeared for six to ten months to have undergone cure, but in which all the symptoms reappeared. In two of these cases the relapse ended fatally; two are still under observation, the relapse in one having just ended in apyrexia.

Apyrexial Forms.—By the side of these indisputable cases of subacute endocarditis tending towards recovery or relapse, Libman also reports 50 cases which were first regarded as cases of chronic rheumatic endocarditis, but which he looks on as examples of a subacute bacteriological endocarditis which had passed into a chronic phase. This view is based clinically on the existence of emboli, progressive anæmia, splenomegaly, progressive renal insufficiency, and a particular kind of pigmentation of the face. In some of these cases autopsy showed lesions of malignant endocarditis, but with little or no evidence of infection of the vegetations, a condition which had replaced the microbic stage in which the surface of the vegetation was covered with cocci. The vegetations were more or less organized, with or without calcification. In the kidneys are found the glomerular lesions characteristic of subacute malignant endocarditis. Libman thinks that in these cases the acute stage had gone almost

unperceived. In this connection we may recall Jaccoud's description of a form of endocarditis lenta without fever.

It appears, then, that malignant endocarditis running a slow course may tend towards cure, leaving nothing more than a chronic valvular lesion. It is therefore wise not to give an absolutely fatal prognosis in such cases. There is, however, little ground for optimism, for Libman only saw recovery four times in 150 cases. Even in the most favourable cases, after months without fever, fatal relapse may take place.

Finally, there is reason to think that there is such a thing as a verrucose endocarditis due to *Streptococcus viridans*, the diagnosis of which, particularly from rheumatic endocarditis, may eventually come to depend on some biological reaction such as a fixed complement, and the course of which is more often towards recovery.

[ETIOLOGY.—Recent papers by Starling³ and Coombs⁴ show that in their experience this kind of endocarditis was commoner than usual in England just after the war, in men who had borne the arduous burdens of prolonged service in the Army. Lewis and Grant⁵ have also brought evidence to show that the particular frequency with which the aortic valve is selected by the disease is largely accounted for by the fact that developmental anomalies of that valve are common.]

TREATMENT.—The fact that subacute malignant endocarditis is practically always due to infection by *Str. viridans* has naturally prompted treatment by antistreptococcus vaccine, and particularly by autogenous vaccine. Yet of 12 recoveries in 419 cases recently reviewed by Capps,⁶ only two occurred in patients treated by these means. (Recently another apparent success has been recorded in Lyons.⁷) These discouraging results led Capps to try another method based on Allison's researches, which showed that an arsenical solution can attenuate or even abolish the virulence of pathogenic streptococci. He gives daily injections of Cacodylate of Soda, most often intravenously, and continued over periods of seven weeks to four months. He used doses varying from 1 to 4 gr. per day, pushing the drug until an alliaceous smell is noticed in the breath, the only contra-indication being intestinal troubles. Of 8 cases with positive blood culture that he treated, only 2 have ended fatally. In 4 the cure lasted eleven years, five years, five years, two years. In the other two the fall of the temperature was only recent. The probability of cure is heralded by the disappearance of the organisms from the blood cultures.

REFERENCES.—¹*Med. Annual*, 1921, 182; ²*Jour. Amer. Med. Assoc.* 1923, March 24; ³*Quart. Jour. Med.* 1923, April; ⁴*Ibid.* July; ⁵*Heart*, 1923, x, 2; ⁶*Amer. Jour. Med. Sci.* 1923, Jan.; ⁷*Bull. Soc. méd. Hôp. de Lyon*, 1923, Feb. 20.

ENDOSCOPY.

A. J. M. Wright, M.B., F.R.C.S.

Bronchial and Œsophageal Foreign Bodies in Children.—Graham's conclusions on this subject, as quoted by Jackson,¹ are as follows: Foreign bodies in the air- and food-passages in children are much more common than was formerly supposed. Statistics show that about 60 per cent of these cases of foreign bodies in the air-passages occur in children. The period of latency of symptoms following the violent dyspnoea and choking attack, and later the gradual onset and chronic nature of the symptoms, may lead one to fail to suspect the presence of a foreign body. The symptoms vary greatly. Peanut kernels, and to some extent other organic foreign bodies, immediately set up a severe laryngitis, tracheitis, and bronchitis. On the other hand, metal objects may remain in the lung for a very long time, doing relatively little damage. Some foreign bodies do not show a shadow when X-rayed, but the location of a non-opaque foreign body in the œsophagus may often be carried out by allowing

the patient to swallow a bismuth-filled capsule, and the X ray then shows the location of the capsule held up by the foreign body. Foreign bodies are very rarely coughed up, and it is unwise to encourage efforts in this direction. The presence of an unexplained leucocytosis, combined with localized symptoms in one lung, the absence of tubercle bacilli in the sputum, and the gradual failure in weight and strength, should suggest the possibility of a foreign body. Extreme weakness is the only contra-indication to bronchoscopy, which should be performed as soon as possible after the entrance of the foreign body. The administration of an anæsthetic is unnecessary for this purpose in children.

Meat and Fish Bones in the Œsophagus.—Guthrie,² in dealing with this subject, points out that bones constitute probably the commonest foreign body met with in the œsophagus. As a rule, no help is to be obtained as to the probable size of the foreign body from the history, which merely tells of a sudden sharp pain while swallowing meat, etc., with subsequent pain and inability to swallow. The patients are usually edentulous, which renders examination easier. An important feature of this type of foreign body is that they tend to cause a rapid inflammatory swelling of the œsophageal wall, in contradistinction to coins, dentures, etc. The occurrence of this inflammatory swelling makes early removal necessary, and such removal difficult. Attempts at removal or dislodgement with a probang or bougie increase the risk of damage to the œsophageal wall. Pain is as a rule severe, and referred more or less accurately to the site of the lesion. This pain is most severe in the case of impaction of a foreign body at the entrance of the œsophagus, owing to the spasm induced in the inferior constrictor of the pharynx. The best line of treatment is removal of the foreign body under direct vision with the œsophagoscope under a general anæsthetic. Instrumentation should be gentle, and the size of tube employed as small as possible to obviate any increase of damage. X rays are often extremely valuable in deciding the size and location of the foreign body. The examination should be carried out with the patient erect and in the oblique position, with the screen to the left side of the back. A thick bread-sauce barium mixture should be swallowed and watched. If two or three mouthfuls pass freely, probably no foreign body is present. In the presence of a foreign body, either delay, arrest, or regurgitation usually takes place. Rarely, although no delay takes place, the food can be seen to be divided into a double stream by a flat piece of bone.

REFERENCES.—¹*Laryngoscope*, 1922, Nov., 868; ²*Jour. of Laryngol. and Otol.* 1923, May, 229.

EPIDERMOPHYTOSIS.

E. Graham Little, M.D., F.R.C.P.

Greenwood¹ gives a clear description of the clinical features of this disorder, which would appear to be increasing in frequency throughout the States. He is perhaps making too sweeping a generalization when he says that all cases of eczema of the hands may be ascribed to fungi except dermatitis due to external irritants, infantile eczema, and those of pyogenic origin. He suggests that washerwoman's eczema is also fungous, and ascribes the increase in frequency of the affection partly to the fashion of wearing heavy woollen socks, which act mischievously in two ways: by keeping the feet moist, and by continually conveying the infection, as wool cannot be easily disinfected. He gives the useful hint that the best place to search for the fungus is not the white macerated tissue which is so characteristic a feature of the clinical aspect, but the advancing edge. Similarly a dried brown vesicle will often yield material when it is absent from the active bleb. In looking for fungus in nails the best plan is to scrape the surface clean with glass, and then to pare thin flakes of the nail with a scalpel for examination. It is always advisable to clear scales

from fat by washing with ether before mounting in potash. A 40 per cent solution of the latter is recommended for rapid clearing, half that strength for specimens which one wants to keep for examination later. Treatment recommended is on usual lines, as detailed in a previous paper. (*See MEDICAL ANNUAL*, 1923, p. 163.)

Feldman and Ochs² report an interesting series of cases of epidermophytosis, treated with Potassium Permanganate in strength of from 1-1000 to 1-5000, the mild strength being used for the more severe cases. Patients treated with this method, compared with patients treated by other means—for example, Whitfield's ointment—showed very much better results. The most resistant form of this complaint, the dysidrotic type, the authors found it was better to treat at first with a 1 per cent aqueous solution of Salicylic Acid, the potassium permanganate lotion being applied later.

Hutchins³ recommends Salicylic Acid as the basis of effective prescriptions for this condition, and gives the useful hint that for breaking up old callosities between the toes, the last abiding-place of the fungus, powdered salicylic acid covered with adhesive plaster so as completely to occlude the treated area is the best device. X rays are only temporary in effect. After-treatment disinfection of clothes is essential, and socks should be boiled for fifteen minutes.

REFERENCES.—¹*Boston Med. and Surg. Jour.* 1922, Aug. 3, 17; ²*Arch. of Dermatol. and Syph.* 1922, Aug., 163; ³*Ibid.* Dec., 761.

EPILEPSY.

Sir James Purves-Stewart, K.C.M.G., C.B., F.R.C.P.

Protein Hypersensitivity as an Etiological Factor.—The possibility of food poisons or food susceptibility as a factor in the causation of certain forms of epilepsy has been advocated for many years. A special group of epilepsies has long been recognized by clinicians which is refractory to ordinary bromide medication but responds in a remarkable manner to the withdrawal of some special article of diet.

Mackenzie Wallis and Nicol¹ have published an interesting preliminary communication on this subject, confessing their inability in the meantime to interpret their results in the light of present knowledge. The tests were carried out with proteins personally prepared by Mackenzie Wallis himself. He described five groups of test proteins: (1) Egg proteins: crystalline egg-albumen of various types. (2) Meat and fish proteins: from beef, mutton, veal, chicken, game, fish, shell-fish, etc. (3) Milk of various animals. (4) Vegetable proteins: ground-nut, vegetables, fruits, nuts, legumes. (5) Cereals, including all the common types of cereal proteins. To these he adds (6) peptone, and (7) a control solution of decinormal sodium hydroxide. These proteins, as far as possible, are kept in solid form in a refrigerator, and weighed out into sterile test-tubes before use. They are dissolved in freshly-prepared decinormal soda, 20 mgrm. to 10 c.c. of soda being the usual strength employed. Since these solutions deteriorate on standing, they are made up fresh every day, especially in the summer months, and all the tests are carried out on the same day as far as possible. The tests are done in the usual fashion by first cleansing the flexor surface of the forearm with alcohol or ether and then applying a small drop of the testing solution to a freshly-scratched mark in the skin, care being taken during the scratch to avoid any bleeding.

The six or seven tests are applied in series to six or seven scratches, and a control with decinormal sodium hydroxide solution is also carried out in an extra scratch. A positive result appears almost immediately in the scratch corresponding to one or more particular proteins. Within fifteen seconds an area of hyperæmia appears, spreading outwards until it extends over an area of about half-a-crown. After leaving the series of protein solutions in contact

with the broken skin for ten minutes, they are washed off and the results of the skin test noted. In cases where a positive reaction has occurred, a small but definite wheal appears, still retaining around it a hyperæmic area. The negative tests and controls disappear so rapidly that it is difficult to see where they have been applied. To make certain of the positive reaction a clean glass slide is applied to the area; in a true positive reaction the hyperæmic area does not become blanched by pressure.

The sensitivity of patients varies from time to time. The tests succeed best when the patient is not fatigued. They are specially marked just before an epileptic fit; after a fit they may become negative for three and a half hours or longer.

Having identified the particular protein to which the patient reacts, treatment is then undertaken. This consists in **Removing the Offending Protein** or proteins from the patient's dietary, and, if necessary, proceeding to desensitize the patient by the administration of small and progressively graduated increasing doses of protein vaccine. Peptone given by the mouth is of value in patients who are sensitive to that particular peptone.

Patients suitable for this treatment are usually found to be non-responsive to bromide medication. They are seemingly healthy persons, usually inclined to obesity, and not excitable or markedly unstable. The absence of response to bromides is often enough by itself to suggest that the patient belongs to this special group. Many of these patients complain of digestive disturbances, and the fits are often precipitated by some special article of diet.

Wallis and Nicol claim that in some cases where it has been possible to adjust the diet on the basis of skin tests, no further treatment, by bromides or otherwise, has been necessary. With regard to the length of time the treatment should be continued, they are unable at present to offer a satisfactory answer.

They are careful to point out that the diagnosis and treatment by means of skin tests, peptone, and diet apply only to one special type of epilepsy, and they disclaim the impression that it is a panacea for all types of epilepsy.

Traumatic Epilepsy.—In a paper read at Glasgow in 1922, Aldren Turner² stated that out of 18,000 cases of gunshot wounds of the head under the British Ministry of Pensions, only 800, or less than 5 per cent, have developed epilepsy.

Epilepsy is met with in two classes of cases: (1) Following slight trauma without obvious gross injury to the skull or brain; (2) True traumatic epilepsy, following penetrating wounds with injury to the skull, membranes, or brain, and associated usually with paralytic symptoms. In the first class it is often difficult to say how far the fit may be attributable to the head injury, but it is an important point on account of the number of ex-service men who have received a minor gunshot wound of the head and who claim that they have in consequence become epileptic. In generalized traumatic epilepsy the disability is characterized by seizures having the characters of ordinary epilepsy. These may follow injury to any part of the brain except the cerebellum, independent of the severity or extent of the lesion. The parietal region provides the greatest number of cases. The time of onset of fits after injury, the so-called latent period, varies from six months to two or three years: most cases develop within twelve months.

Jacksonian epilepsy is rare in comparison with the incidence of ordinary traumatic epilepsy, and shows a tendency towards spontaneous cure, in contrast to the generalized epileptic cases. It tends to develop earlier than the generalized form and rarely passes into it.

Generalized traumatic epilepsy following brain wounds is attributable in part to the injury, but in greater part to the patient's constitutional disposition. Local phenomena at the seat of injury only explain part of the symptoms;*

hence the unsatisfactory outlook in the majority of cases. The very small percentage of cases of gunshot wound of the head which develop epilepsy is remarkable.

The treatment of traumatic epilepsy by **Plastic Operations** on the cranium and meninges so as to close in the gap by a bony graft, has continued to give encouraging results in the hands of skilled neurological surgeons. G. Giorgi³ gives detailed accounts of 23 such cases, on which various plastic operations were carried out. Cases of traumatic Jacksonian epilepsy usually showed an immediate post-operative period of aggravation of the attacks, lasting five or six days. Later followed the phase of improvement, with cessation of the Jacksonian attacks, temporarily or permanently. Relapses, however, are liable to occur after months or years. Sometimes the condition relapses to its pre-operative severity. Giorgi says this is occasionally due to non-ossification of the bony graft in the cranium, and a fresh grafting operation may cure the attacks. Others are due to a delayed cerebral abscess, which also calls for operative intervention. Traumatic generalized epilepsy, of which Giorgi records 4 examples, is also amenable to surgical treatment; complete disappearance of the attacks was observed in each instance. One case of traumatic psychic epilepsy was also completely relieved. In 4 out of his 6 cases of spastic paresis due to cerebral trauma, improvement of function was observed.

TREATMENT.—The combination of **Bromide with Borax**, familiar to physicians for many years, is of value in chronic epilepsy. McCartney⁴ gives results of treatment in 18 epileptic and insane patients, 15 of whom had been epileptic for over twenty-one years. The remaining three had had fits for six, ten, and twelve years respectively, before commencing the combined bromide and borax régime. In the first series of 15 cases, the number of fits fell from a total of 1886 in the year to 494, a reduction of 72 per cent. In the last series of 3 cases, the total number of fits in the year preceding treatment was 119; the total in the past year was 7. Marked general improvement was observed in the mental condition of the patients: they were less irritable and quarrelsome, whilst formerly degraded habits were completely changed. The best results were obtained by a prescription containing potassium bromide 15 gr., borax purificatus 7½ gr., liq. arsenicalis 2 min., three times daily. In addition a laxative was given at bedtime.

Further experience confirms the value of **Luminal** in the treatment of epilepsy, originally introduced in 1912 by Hauptmann.⁵ Carrière⁶ claims that it is still more efficient if combined with **Potassium Borotartrate**. He begins the combined treatment with 20 gr. of potassium borotartrate and 1·25 gr. of gardenal—the French equivalent of luminal—three times a day. If necessary, the gardenal is later increased to 1·5 gr. in each dose. The maximum used by Carrière is 50 gr. of potassium borotartrate with 3 gr. of gardenal, three times a day. He claims better results for this mode of treatment than for any other which he has tried.

On the other hand, Maillard,⁷ of the Bicêtre, in conjunction with Meignant, strongly urges the benefits of pure luminal medication. They consider it by far the most efficacious drug at our disposal. So much so, that for the past three years they have entirely given up the use of bromides in their wards at the Bicêtre. They maintain that any unsatisfactory results recorded after luminal medication are due either to insufficient dosage, too short a course of treatment, or insufficient control in its administration. Compared with the old bromide treatment, they record a number of cases in which the striking superiority of luminal was evident. Thus, for example, *Fig. 42* represents the results of treatment in a man of 27, who had suffered from epilepsy since

the age of 15. For seven years he was treated by bromide combined with chloral and with a salt-free diet. Nevertheless he continued to have an annual average of 300 to 400 major attacks and 60 to 100 minor attacks or 'vertiges'. In November, 1920, he commenced gardenal treatment. All attacks, both major and minor, at once disappeared. Together with this, there was a remarkable improvement in his mental condition. The patient, previously depressed, impulsive, and dangerous, unfit to leave the mental ward, was able, after several months of gardenal treatment, to be discharged. He now works regularly in a teaching establishment, at first as a porter, and latterly, for more than a year, in a position of trust. His mental condition is completely changed.

Maillard and Meignant consider bromide, borax, potassium borotartrate, somnifène, all of them, as inferior to *Gardenal*. They find gardenal so efficacious in every variety of epilepsy, in contrast with its complete failure in hysterical attacks, that they use it as an important diagnostic measure for the differentiation between epilepsy and hysteria. They have never observed an increase in the number of minor attacks during gardenal medication, as suggested by Cheinisse.⁸ On the contrary, both major and minor attacks diminish and sometimes disappear

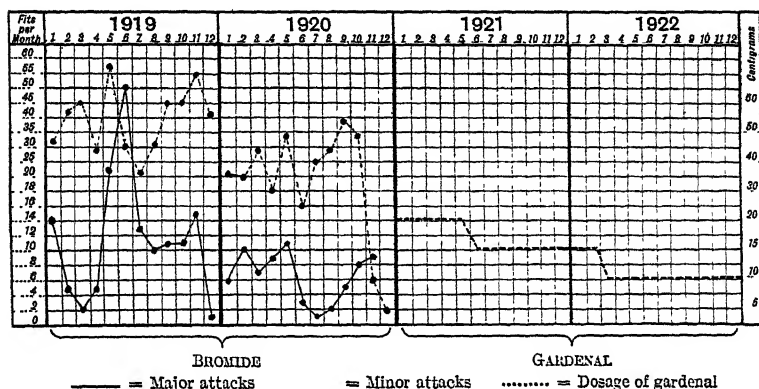


Fig. 42.—Chart illustrating treatment of epilepsy by bromide and gardenal respectively.

altogether. Moreover, contrary to the views expressed by Divry,⁹ who thinks that under luminal treatment mental symptoms, in the form of obsessions, tend to increase, they find a considerable improvement in the mental condition of their patients. Together with this, the patient's general condition improves, his appetite is better, he gains weight, and his physical and mental activity is often so much improved that he can be discharged from the wards and continues his treatment as an out-patient. They remind us, however, that the epileptic is notoriously liable to neglect his regular routine treatment. They consider that cases where fits reappear in batches are often explained by the patient having failed to take his regular doses of gardenal. Hence the value of strict medical supervision, to ensure that the patient actually takes the medicine prescribed for him.

Patients vary in their susceptibility to the effects of gardenal. Hence the importance in every case of proceeding carefully to find the optimum dosage. As a rule, in an adult of good nutrition and free from signs of visceral disease, the total daily dose for a man is $4\frac{1}{2}$ gr.; for a woman, 3 gr. At breakfast, the patient takes $1\frac{1}{2}$ gr. in tabloid with a little water; at the evening meal he takes

two more tabloids—a woman takes only one. Usually the beneficial results are shown within a few days. It is at this period that one is liable in a few cases to see transient slight mental symptoms in the form of drowsiness or languor, or, less frequently, slight emotional irritability. If these symptoms appear, the dosage is diminished but not suppressed. Usually the psychical symptoms clear up in a few days or weeks. In many cases 3 to $4\frac{1}{2}$ gr. of gardenal daily cut short both major and minor attacks. Gardenal is not a cumulative drug, and these authors see no advantage in alternating it with other drugs such as bromides, or in combining it with potassium borotartrate. When a patient has been several months on a daily dose of 3 to $4\frac{1}{2}$ gr. of gardenal without attacks of any kind, we may try cautiously to reduce the dose, cutting it down by $\frac{3}{4}$ gr. daily at a time. Before attempting this, however, we should warn the patient that he may have another fit if his dose falls too low. But he need not be perturbed, for if he resumes his initial efficient dose the fits will cease again. We gradually cut down the daily dose by $\frac{3}{4}$ gr. each time, leaving an interval of several months between each successive diminution. On the other hand, there are other cases in which the usual dose of 3 to $4\frac{1}{2}$ gr. is insufficient and does not produce the desired diminution or disappearance of the fits. In such cases we increase the dosage, carefully watching the patient, especially during the first few days. The daily dose may reach 6, $7\frac{1}{2}$, 9 gr., or even more, before the patient shows signs of intolerance. Maillard and Meignant do not agree with the dictum of Divry, who states that gardenal produces its maximum effects with a moderate dose of $1\frac{1}{2}$ to $2\frac{1}{2}$ gr., and that higher doses of 6 or 7 gr. produce little or no improvement. Maillard and Meignant, on the contrary, state that they either get immediate results with moderate doses, or, if not, they proceed at once systematically with higher doses, which often succeed. They do not succeed in every case. Some cases remain refractory to gardenal. In these difficult cases they add a moderate dose of potassium bromide or of sedobrol to the gardenal.

Many epileptics, as above mentioned, unless carefully supervised, tend to become careless as to their treatment, taking the gardenal irregularly, or even, in hospital patients, throwing it away. This may be one reason for the discordant reports of various observers, in whose patients the treatment may not have been carefully supervised by the resident doctor or the nurse.

Gardenal treatment does not necessitate any special dietetic régime, and the patient, as he finds himself improving under treatment, is encouraged to resume an ordinary life. The only drawback of the gardenal treatment, according to Maillard and Meignant, is that in most patients its toxic and therapeutic doses are so near to one another. The signs of a toxic dose of gardenal are chiefly psychical, consisting of drowsiness, hebetude, mental confusion, occasionally signs of excitement, talkativeness, a drunken appearance with reeling gait, difficulty in speech, and sometimes hallucinations. These phenomena are very similar to those of acute alcoholic intoxication. They subside when the dose of gardenal is reduced, or may even disappear spontaneously in a few days or weeks, even if the gardenal is continued.

Removal of Adrenal Tissue.—Within the last few years an interesting theory as to the causation and treatment of certain cases of epilepsy has been maintained by Heinrich Fischer,¹⁰ who performed a number of experiments on the adrenal bodies which led him to the conclusion that by reducing the amount of adrenal tissue in the body the tendency to convulsions can be reduced. The essential tissue removed in these cases is the cortical substance, part of the chromaffin system of the body. Fischer regards the fit-producing mechanism as a combination of brain, adrenal system, and musculature.

This theory of Fischer's has been taken up by Brüning¹¹ and put to a

practical test in human patients. In 14 cases of epilepsy he removed part or the whole of one adrenal gland. He reports no mortality from the operation, in spite of its severity; 3 of his cases were still under treatment. Of the other 9 cases, he claims that 5 are cured; 1 case has attacks which are less severe and of shorter duration, but occur more frequently than before; in 3 cases, age 38, 52, and 45 respectively, who had had attacks for a long time, no improvement was observed. It is characteristic of all cases that, if the attacks are going to cease, they do so shortly after the operation. Borszéký,¹² of Budapest, has operated by Brünig's method in 9 cases with severe genuine epilepsy. All his patients had been unable to follow their ordinary occupation, and their fits had remained uninfluenced by full doses of luminal or bromides. No case of traumatic epilepsy was included. The ages of his patients varied from 15 to 51 years. In each case one adrenal body, the left, was removed. No ill effects were observed on the blood-count or on the blood-pressure. The adrenal body was normal in structure in every case except one, in which there was an adenoma the size of a hazel-nut. Curiously enough, the best and most lasting result was obtained in the case with the adrenal adenoma. One of the other 8 cases, after a four weeks' interval free from fits, became as severely ill as before. The remaining 7 cases were improved to the extent that the attacks were for a time diminished in severity and became more easily controlled by luminal. In Borszéký's cases there was usually a period of a couple of weeks after the operation before improvement set in. Unfortunately the improvement in these cases was not permanent; four or five months after operation they were as bad as before. Whether this was due to compensatory hypertrophy of the surviving adrenal is an open question. A still less rosy outcome of this operation is recorded by Küttner and Wollenburg,¹³ of Breslau, who performed it in three cases, with uniformly disappointing results. Two of their patients derived no benefit, whilst the third was distinctly worse afterwards.

REFERENCES.—¹*Lancet*, 1923, i, 741; ²*Jour. Neurol. and Psychopathol.* 1923, Feb., 309; ³*Políclínico*, 1923, March, 144; ⁴*Brit. Med. Jour.* 1923, i, 16; ⁵*Munch. med. Woch.* 1912, Aug. 27, 1907; ⁶*Revue neurol.* 1922, xxix, 1529; ⁷*Presse méd.* 1923, June 9, 522; ⁸*Ibid.* 1922, No. 4, 42; ⁹*L'Encephale*, 1922, March; ¹⁰*Zetis. f. d. ges. Neurol. u. Psychiat.* 1920, ix; ¹¹*Zentralb. f. Chir.* 1920, No. 43, 1314; ¹²*Ibid.* 1922, July 22, 1053; ¹³*Ibid.* 1923, March 17, 430.

ERYTHEMA INFECTIONOSUM.

J. D. Rolleston, M.D.

M. W. Scheltema¹ gives the following account of erythema infectiosum, which is sometimes known as the 'fifth disease'. The disease occurs mainly in children, but cases have been recorded in adults and infants. The incubation period varies from seven to fifteen days. Prodromal signs are usually absent, though conjunctivitis and general disturbances, such as lassitude, vomiting, and headache, have been described. The most important and usually the only sign of the disease is the eruption, the characteristic features of which are as follows: It is remarkably changeable and polymorphous, so that the term 'erythema variabile' has been suggested for it. In some areas such as the neck and loins it is discrete, while in others, such as the cheeks and arms, it is thickly set and circinate. The principal and sometimes the only region affected is the face. Erythema suddenly appears upon the cheeks; where the eruption is somewhat irritating, and resembles urticaria. The swollen skin is sharply marked off from the pale area round the ears, mouth, and chin. On the forehead the lesions are more discrete. The other parts chiefly affected are the extensor surfaces of the upper arms and forearms, the shoulders, loins, calves, and front of the knees. On the extensor surface of the arms the lesions rapidly coalesce in a large bluish-red patch and assume a circinate appearance. The back of the feet are rarely attacked, and the backs of the hands and soles

PLATE XV.

ERYTHRÆDEMA



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always escape. The eruption may be visible one moment and be gone the next. Rubbing, stroking, or warming the part makes the rash more distinct. As a rule the fever is only slight, but temperatures of 103° and 105.8° have been observed. Constitutional disturbance is not pronounced, coryza is absent, sore throat is very slight, and there are no Koplik's spots or strawberry tongue. The submaxillary, cervical, and axillary glands are sometimes a little enlarged, as well as the spleen, but there is no considerable adenitis as a rule. The urine rarely contains albumin, and the diazo-reaction is negative. The blood shows leucopenia, with a lymphocytosis of 36 to 37 per cent and eosinophilia. Erythema infectiosum must be distinguished from scarlet fever, measles, rubella, erythema multiforme, erysipelas, the serum disease, and drug eruptions.

REFERENCE.—¹*Nederl. Tijds. v. Geneesk.* 1923, i, 1225.

ERYTHRÆDEMA (Pink Disease). *Frederick Langmead, M.D., F.R.C.P.*

Although this disease of infants has, apparently, been known in Australia for a quarter of a century, no attention was drawn to it in the literature until the paper by H. Swift¹ in 1914; but in 1921 A. J. Wood and F. H. Cole² were able to compile records of 91 cases. Other papers have appeared by Clubbe,³ Weston,⁴ Bilderback,⁵ Byfield,⁶ Zahorsky,⁷ Cartin,⁸ Emerson,⁹ Freed,¹⁰ Weber,¹¹ and Thursfield and Paterson.¹² Few cases have been recognized in this country, only two having been reported, one by F. P. Weber, the other by H. Thursfield and H. Paterson.

J. Zahorsky¹³ reports four cases, and summarizes the semeiology of the disorder. The mode of onset is somewhat obscure, but a rash, variously described as eczema, erythema, scarlet fever, German measles, urticaria, and impetigo, seems usually to have been the first symptom. In others no early rash is recorded, but a striking change in the disposition of the child, who becomes irritable and sleepless, and refuses food. Fever, respiratory catarrh, or digestive disturbance are other initial features.

SYMPTOMS.—Zahorsky regards the *change in disposition* as the most constant manifestation. The child becomes miserable and inactive, sleeping irregularly, and waking and crying many times during the night. He takes no interest in his food or toys, and is uncomfortable whether sitting up or lying down.

The Skin.—While often the earliest sign, the eruption is usually preceded by the symptoms mentioned above. The rash usually appears suddenly, and is apt to be regarded as that of measles, rubella, or scarlet fever, especially when it is accompanied by a slight fever. It may appear more slowly and resemble eczema, or be fleeting and changeable and be mistaken for erythema multiforme or urticaria. The eruption fades after a few days, and then reappears, and varies from day to day. The most characteristic rash is like that of prickly heat, consisting of minute papules, surrounded by a narrow areola, and is more profuse on the trunk than on the extremities. It often encircles the hair and neck. There may be erythematous patches on the cheeks, but otherwise the face is little affected. Other erythematous patches may appear on the outer side of the thighs, the loins, buttocks, arms, or neck. They may be scored by the nails and scaly. The whole skin may be reddened, which, with the papules, simulate the rash of scarlet fever. Secondary infections have sometimes led to furunculosis, impetigo, ulceration, and gangrenous areas. Intolerable itching is a prominent feature. Two of the children mentioned by the writer pulled out their hair continually—a symptom noted by other observers. In Zahorsky's judgement the skin is not pink, but dusky or garnet red. On the other hand, the rash may be transient and amount to no more

than erythema, or even fail to appear. Profuse sweating may be general or limited to certain areas, and may be accompanied by a peculiar odour. Shedding of the nails and paronychia have been reported.

The Hands and Feet.—The changes in the hands and feet are conspicuous, and have given rise to the term 'raw-beef hands and feet'. The fingers are bluish-red and swollen and may desquamate, while the whole hands are enlarged, sweat freely, and in severe cases are icy cold. The dorsal surfaces may be covered by a discrete papular eruption. The feet are similarly affected.

Gastro-intestinal Tract.—The mouth is normal in about one-third of the cases; in others congestion of the alveolar and buccal mucous membrane, with or without ulceration, may be observed. The babies seem prone to bite and chew their tongues, suck their fingers, or push their fists into their mouths. A peculiar feature is softening of the gums and loosening of the teeth, which, though healthy, fall out. The lower jaw is chiefly affected, the four lower incisors and two lower canines being involved in 5 of 21 cases (Zahorsky). Obstinate anorexia is a cardinal symptom, but vomiting or diarrhoea is exceptional, though green slimy motions are common, as is also excoriation about the anus.

The Respiratory Tract.—Bronchitis and nasal obstruction are frequent, and lobar pneumonia has occurred.

The Nervous System.—Hyperæsthesia and pain on moving the limbs are often present, while paræsthesia is recognizable in most cases. Large areas of anæsthesia occurred in one of the cases. Nearly always muscular weakness prevents the children from sitting up if unsupported, or from standing, while voluntary movement of the limbs may be in abeyance for several weeks. The reflexes are very variable and may be unaltered. At first the deep reflexes are often exaggerated, later to become weakened or lost, particularly in the legs. Photophobia may be present.

The Circulation.—Tachycardia generally occurs, but the heart's sounds are unaltered. The blood-pressure was greatly increased in one case.

Fever.—There is usually no fever, but in one case 101° was charted for several weeks on end. The temperature may be subnormal in a severe case.

Genito-urinary System.—Rubbing and scratching of the genitals, a frequent habit in this disease, leads to erythematous patches or even to ulceration, while many patients suffer from painful or difficult micturition.

The Blood.—A marked leucocytosis (12,000 to 30,000) is the rule in severe cases, the proportion of polymorphonuclear cells being increased except in very young infants, when they may be equalled by the lymphocytes. There is no definite anæmia.

In a recent article D. Paterson and J. G. Greenfield¹⁴ give a full description of the disease, and record 5 cases. They include the following symptoms among others—hypotonia, loss or diminution of tendon reflexes, and relative or absolute anæsthesia over the extremities, and have found pathological evidence of peripheral neuritis and of chronic inflammatory changes in the spinal cord and nerve roots, on which sensory nerve-fibres are affected more than the motor. For these reasons they designate the disorder erythredema polyneuritis. *Plate XV*, illustrating the condition, is taken from their article.

REFERENCES.—¹*Lancet*, 1918, i, 611; ²*Med. Jour. of Australia*, 1921, Feb. 19; ³Quoted by Wood, *Ibid*; ⁴*Arch. of Pediatrics*, 1920, Sept., 513; ⁵*North-West Med.* 1920, Oct., 263; ⁶*Amer. Jour. Dis. Child.* 1920, Nov., 347; ⁷*Jour. Missouri State Med. Assoc.* 1920, Aug., 317, *Med. Clin. North Amer.* 1922, July 6, 97, *Jour. Missouri State Med. Assoc.* 1922, July, 296; ⁸*Pennsylvania Med. Jour.* 1921, Feb., 287; ⁹*Jour. Amer. Med. Assoc.* 1921, July 23, 285; ¹⁰*Arch. of Pediatrics*, 1922, Feb., 116; ¹¹*Brit. Jour. Child. Dis.* 1922, March, 17; ¹²*Ibid.* 27; ¹³*Jour. Amer. Med. Assoc.* 1922, Dec., 975; ¹⁴*Quart. Jour. of Med.*, 1923, Oct., 6.

EYE AFFECTIONS, GENERAL. (*See also CATARACT; EYE, GENERAL THERAPEUTICS OF; OPTIC NERVE; REFRACTION; RETINA.*)

A. Bernard Cridland, F.R.C.S.E.

Industrial Ophthalmology.—Van Kirk,¹ writing on this subject, basing his observations on a survey of 25,000 cases in Pittsburgh, deals with the question of protection of the eyes in metal workers, and the value of first-aid treatment, which should be under the immediate control of an ophthalmic surgeon. He mentions that in cases where the cornea or pericorneal tissues are burned, atropine should be used with caution lest glaucoma should set in. He speaks highly of the value of *Dionine* in the clearing of corneal opacities, and says its long-continued use may produce almost unbelievable results. He finds a second attack of electric conjunctivitis is more severe and prolonged than a first attack, and concludes that severe injuries to the eyes can be greatly reduced by educating the employees and by the compulsory use of goggles and other safety devices; further, that efficient first-aid treatment, preferably by an ophthalmic surgeon, is essential for the care of minor injuries, and will so reduce the amount of lost time to a minimum, and almost eliminate the occurrence of corneal ulcers. In the discussion which followed Van Kirk's paper the question as to treating the injured eye by the open method or occlusion was referred to by several speakers, and the general opinion was in favour of covering the eye with a pad and bandage for twenty-four hours.

Robson² has found that in the South Wales coalfields the case incidence of *coal-miner's nystagmus* is in proportion to the volatile content of the coal. Thus Monmouthshire, with a volatile content of the coal of 29·5 per cent, gave 4·56 per cent of nystagmus amongst men employed underground; Glamorganshire East, with 29·5 per cent, showed 2·22 per cent of nystagmus; Glamorganshire West, with 25·5 per cent, 1·9 per cent; and Carmarthen, with 11·86 per cent, 1·15 per cent. The statistics, he maintains, appear to show "a partial parallel analogy in the incidence of nystagmus to percentage of volatile matter as disclosed by analysis of the various seams passing from East to West and from South to North." Examined in these directions the coal is progressively less bituminized, but as it is not homogeneous it is difficult to establish the exact relation of the statistics. The gas generated is carbon monoxide.

The observation is an interesting and important one, and is welcomed by a number of surgeons interested in coal-miner's nystagmus, who have doubted whether deficient illumination in the pits was the chief or sole factor in the production of the disease. Many have thought that the possibility of gaseous poisons could not be disregarded, and the results of the further investigation of coal dust and mine gases which is now being carried out will be awaited with interest.

The Light Sense, with special Reference to Navigation.—Freeland Fergus³ mentions that there are at least four functions of vision which are necessary for candidates for this calling. They are: (1) Good visual acuteness; (2) Sufficient form sense, or, as he would call it, field vision; (3) Approximately normal colour vision; and (4) Good light sense. He especially lays emphasis on the importance of the last named, which should be tested as carefully as the colour sense; he finds Percival's rings for minimum light sense and light difference excellent for the purpose. He further points out that most manual work does not depend on macular vision at all, but on what he has called field vision, and that therefore it is idle to attempt to evaluate manual efficiency in terms of visual acuity as ordinarily defined.

The Toxicæmic Aspect of Ocular Disease.—Percy Dunn⁴ says that thyroid insufficiency may be translated into failure of the thyroid to protect the body

against some source of toxæmia ; that too little notice is taken of the hypothyroid condition which accompanies, say, an iridocyclitis of toxic origin, and it is not enough to inquire alone into some recognized focus of septic infection. He has found, for example, that thyroid extract given in doses of 3 gr. daily, combined with a generous diet and rest in bed, has proved of great value in cases of interstitial keratitis. Reference is made to sympathetic ophthalmia, in which the possibility of a general toxæmia as a cause is mentioned ; and, apart from sympathetic ophthalmia, the importance of the rôle which intestinal sepsis may play in ocular diseases is insisted upon.

Intracranial Infection by way of the Ophthalmic Vessels.—Gallemaerts⁵ describes the danger of thrombophlebitis progressing from the branches of the facial vein through the superior ophthalmic to the sinus cavernosus, and holds that every furuncle of the face should be treated early and radically by the galvanocautery.

Ophthalmic Migraine.—A. R. Moodie⁶ describes a case of ophthalmic migraine associated with epileptic fits. Marin Amat⁷ reports three new cases of *migraine with ophthalmoplegia followed by persisting sensorimotor disturbances in the ocular muscles on that side and atrophy of the optic nerve on the other side*. In his first case, published in 1919, the pain returned three times in the course of five years, finally becoming so severe that the woman of 29 became imbecile and died. In the second case, this ophthalmoplegic migraine of a month's standing seemed to be arrested by protein therapy. The woman of 56 has had no recurrence during the year or two since the course of three parenteral injections of 4 c.c. of milk. She seems now entirely well. The third patient seemed to be doing well under the course of protein therapy ; the pain had subsided, but the ophthalmoplegia persisted, and the woman died suddenly five days after the last parenteral injection. The fourth patient was a man of 55, and the intense pain in the left side of the head and brow had first appeared, with the total oculomotor paralysis, a month before. Protein therapy and other measures gave no relief in the case. Marin Amat says that about 100 cases of this recurring painful paralysis of the ocular muscles had been published by 1920. It progresses from a recurring affection to become continuous, with periodical exacerbations. He never found any evidence of syphilis in his four cases, but the patients had all been subjected to privations. Many of the cases on record terminated fatally. Protein therapy seemed to be responsible for the cure in one or two of his cases, but displayed no efficacy in the others. The extreme intensity of the pain and the absolute failure of all measures for relief might justify a palliative operation on the nerves involved, or injections of alcohol.

Squint.—Oscar Wilkinson⁸ considers that it is necessary to operate on children earlier than is the usual practice, so that binocular vision can be obtained at an age when this can be acquired. In cases of deviation of 24° or less, he is satisfied with an advancement of the external rectus ; over that amount, both external recti are advanced, and in order to ensure healing of the muscle in its new position a 'brace' is made use of. This consists of a piece of lead 0.5 mm. thick and shaped much like a heraldic shield, which is sewn over the internal rectus and allowed to remain in place for ten days. The object of the brace is to stretch the internal rectus and immobilize the eye during healing of the external rectus in its new position. The author is averse to tenotomizing the internal rectus, and has adopted this procedure to obviate it.

Blepharitis.—Ronne⁹ declares that blepharitis is easily recognized and treated, and yet it is frequently overlooked. A true hordeolum is a certain sign of the affection. The hard dry scab in the eyelashes must be removed. The main thing in treatment is persistence. The salve should be rubbed into the edge of the lids every night on retiring. Blepharitis of many years' standing will

PLATE XVI.

EYE EXAMINATION

(THE GULLSTRAND SLIT LAMP AND CORNEAL MICROSCOPE.)



Sympathetic ophthalmia. Above, Descemet's deposits. Below, one of many new blood-vessels in iris and on capsule. The iris shelf is adherent to the capsule, not the pupillary margin. This is seen only in chronic uveitis.

*Plates XVI to XIX kindly lent by the
'Journal of the American Medical Association'*

PLATE XVII.

EYE EXAMINATION--*continued.*



Chocolate-colored deposits in and on the iris, with a capsular exudate and pigment proliferation. Chronic glaucoma.



Penetrating iris injury caused by a flying piece of steel. Retinal pigment layer in the wound, no pupillary marginal pigment change.

PLATE XVIII.

EYE EXAMINATION—*continued.*



Retained pupillary membrane showing many fibrous attachments to the iris shelf.



A group of congenital pigment cells on the anterior capsule. Patient had retinal blood-vessel tuberculosis.

PLATE XIX.

EYE EXAMINATION —continued.



An adherent leukoma: secondary glaucoma; a broad iridectomy; vision 30. Type 1. The iris, incarcerated in the ulcer, is evident as a thin, atrophic layer. The margins about the iridectomy and pupil show a few narrow synechia, and the superior temporal side a large, irregular triangle of unaltered retinal pigment. Fine pigment over and in stroma.

yield to systematic scraping off of the scales and application of the salve. If there is ulceration, all eyelashes involved should be pulled out. The fat in the salve is the main thing. Acute exacerbations promptly subside, but chronic blepharitis continues its course until conquered by patience and perseverance.

Skiagraphy in Obstruction of Lachrymonasal Duct.—H. P. Doub and J. M. Carter¹⁰ have made use of skiagrams of the nasolachrymal duct as an aid in determining treatment in case of obstruction. After syringing, the nasolachrymal passage is injected with Beck's bismuth-and-oil paste, the amount varying from 0.5 c.c. to 1 c.c., according to the degree of obstruction. Localization of the obstruction point is further aided by a small silver rider placed over the anterior end of the middle turbinate, or by outlining the latter with a strip of bismuth paste. Skiagrams are then taken from several angles.

A number of normal cases were thus investigated, and interesting variations from the generally accepted normal were found; for example, in some the lumen was very tortuous, and in a few the sac and duct showed a side-to-side union instead of the usual end-to-end. In the obstructed cases the size of the sac varied from great dilatation to a greatly reduced size from scar-tissue contraction following abscess formation. In cases that had been operated on without complete success, the skiagrams proved a valuable aid in determining further methods of surgical procedure.

[The above method of investigation should prove of considerable aid in dealing with this troublesome condition, which in some cases presents no little difficulty in effecting a complete cure.—A. B. C.]

Examination of the Eye by Direct Sunlight.—Edward Jackson¹¹ describes his method of using direct sunlight for the examination of the eye generally. The light is reflected directly from a small mirror through a 50-mm. aperture into the dark room. The aperture holds a ring that can be revolved, and which carries two clips in which may be placed slits or circular apertures of various sizes, ground glass, or glass, to cut out undesirable radiations. The author rightly claims that direct sunlight is the ideal illuminant, and has only been approached in value by the Gullstrand slit lamp. Unfortunately in this country, where sunshine is inconstant, it would not be convenient to have to rely solely or even mainly on sunlight as an illuminant, although in the author's country it would be otherwise.

Examination by the Gullstrand Slit Lamp and Corneal Microscope.—Arthur J. Bedell¹² communicates the results of 250 examinations of the eye by means of this apparatus (see Fig. 43 and Plates XVI to XIX). His observations have been mainly of the iris, in both normal and pathological conditions. Embryological changes in slight degrees appear to be more frequent in occurrence than the ordinary methods of examination have shown. The study of the two kinds of pigment—namely, retinal and iritic—is interesting. The former, situated in the pupillary margin, appears always as a dark-brown mass, varying in density and extent, and often seen as a layer; sometimes it can be seen to have undergone irregular absorption. The latter, giving the distinctive colour to the eye, is of endless variety, ranging in colour from light yellow to intense brown and often extremely irregular in distribution. Bedell holds that pigment deposits of this type on the capsule of the lens may be embryological, although when found about the iris margin they are indicative of present and past inflammation of the iris, whilst vascularization of dense brown masses is evidence of severe chronic uveitis. Irregular pigment granules on the posterior layer of the cornea and in the aqueous are definitely pathological, and most often are found in glaucoma. In chronic iritis a diagnosis is easily made by observing the adhesions at the pupillary margin and the proliferation of retinal pigment;

this is especially valuable in 'quiet iritis', which may otherwise escape diagnosis. In interstitial keratitis where vascularization in the cornea is present, the definite blood-stream is demonstrable in all fresh cases, and only in permanent, small, central opacities is blood absent. Minute deposits on Descemet's membrane can be detected which would by other methods escape notice. In glaucoma the acute cases are difficult to examine. The chronic inflammatory forms usually show migration of pigment, but not all, so that this finding can only be regarded as support for the diagnosis. In simple chronic glaucoma, absorption of pigment is seen in some cases, occasionally very extensively, so that the iris appears moth-eaten, whilst the iris blood-vessels are very numerous.

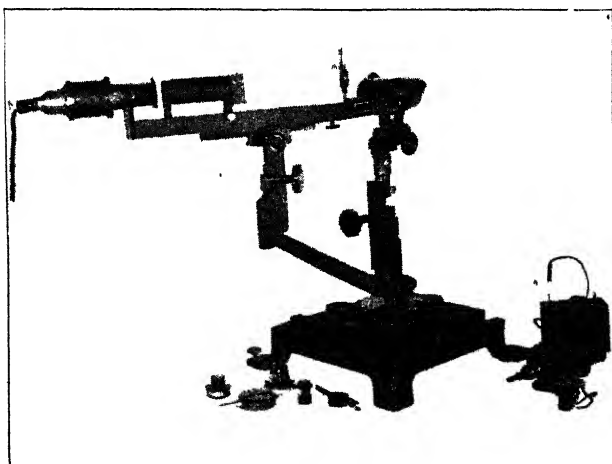


Fig. 43.—Slit lamp: movable base with lamp and microscope attached so that the two may be moved together, an arrangement that is of the greatest practical value. (Kindly lent by the 'Journal of the American Medical Association'.)

Foreign Bodies in the Globe.—James M. Patton¹³ comments on the differences of opinion that exist amongst experienced surgeons in the treatment of intra-ocular foreign bodies. Some are very insistent on the value of localization by skiagram, others less so; and whilst one well-known surgeon does not hesitate to introduce the tip of the magnet into the vitreous, another, equally experienced, considers that the danger from the operative trauma is greater than from the presence of the foreign body. Patton agrees with Derby, who holds that "in every injury of the eye the possibility of an intra-ocular foreign body should be considered." A statement by the patient that he is absolutely sure that there is no foreign body in the eye should not be accepted easily. To aid the skiagraphist, Patton makes use of a procedure adopted years ago by H. Gifford, as follows. A small bit of metallic substance, preferably a piece of sterilized wire or lead, is inserted just beneath the conjunctiva as close to the limbus as possible above and below. This is easily accomplished under cocaine anaesthesia, and the markers are removed immediately after the exposure before the cocaine effect has worn off. He is of opinion that it is justifiable to try the magnet before a skiagram has been taken, in the case of foreign bodies that are small and probably well forward; but if the foreign body is apparently far back, localization is valuable. Again, with Derby, he

agrees that it is unwise to lose valuable time in waiting for a skiagram; but, on the other hand, where this can be obtained in, say, an hour, it should be done. Before operating, the pros and cons of saving the eye are put before the patient.

Patton makes use of the ring magnet, which he finds, as do now most surgeons, the most powerful and convenient. He mentions a useful operative point when the foreign body has reached the anterior chamber—namely, that in opening the latter the current is kept on, thus converting the keratome into a magnet, the result being that the fragment flies to the keratome and is thus most easily extracted. As to the route of extraction, Patton does not favour the corneal over the scleral, but deals with each case on its merits. If a foreign body is small and smooth, it is delivered through the anterior chamber; but if large and jagged or firmly fixed posteriorly, the author considers the route through the sclera to be the best. For adherent foreign bodies he emphasizes the value of switching the current off and on repeatedly, thus 'jerking' the foreign body, and if the latter can be seen through the pupil embedded in the sclera a knife needle is used to loosen it.

With regard to after-treatment, the patient is kept in bed with both eyes bandaged, and is dealt with as though intra-ocular infection were commencing, by giving Salicylate, Inunctions, and Hot Packs. The author mentions that copper and brass fragments appear to be more easily tolerated than other non-magnetic substances, and it has occurred twice in his experience that such metals have worked their way outward through the coats of the eye.

[No mention is made of the small, useful, skeleton-free skiagrams of the anterior part of the eye that can be obtained by placing the small films, such as are used in dental work, on the inner side of the eye close against the nose, and the exposure made from the outer side of the eye. The films can be shaped to fit in as closely as possible. An exposure can also be made from above or below the globe.—A. B. C.]

Anaphylactic Conjunctivitis.—Henri Lagrange¹⁴ reports a case of conjunctivitis, of anaphylactic origin, in which the source of irritation was the cutting and handling of green wood. The patient, a man of 65 years, and incidentally a diabetic, suffered from attacks of chemosis and swelling of the lids, accompanied by much irritation. The cutaneous reaction for green wood was found positive, and bacteriological examination showed an absence of any micro-organisms.

Anaphylactic Keratitis.—Walker¹⁵ reports a case of this condition which occurred in a young healthy man who had an intravenous injection of serum prepared apparently from a small quantity of his own blood. An anaphylactic reaction followed in twenty minutes, and two days later the right eye became inflamed. Subsequently an acute deep keratitis with iritis developed. The keratitis was diffuse, involving nearly the whole cornea. The condition cleared up under treatment in twenty days, leaving a punctate leucoma.

Amaurosis in Infants.—Writing on this subject, Doyne¹⁶ mentions the impairment of vision with no gross ocular lesion, in which the condition may be the first sign of mental deficiency; these cases eventually obtain enough vision to get about by themselves. The lesion is probably cortical. In partial albinism the deficiency in pigmentation delays the development of fixation, but the eventual prognosis as to sight in such cases is good. A temporary amaurosis may be associated with basal meningitis if the attack is a slight one; in the more severe cases more or less vision is permanently lost and evidence of optic atrophy appears.

The suggested pathological explanation in these cases is that the basal meningitis temporarily seals the foramen of Majendie and so causes distention

of the third ventricle, which by pressing upon the optic chiasma interferes with the visual pathways.

REFERENCES.—¹*Jour. Amer. Med. Assoc.* 1922, Sept. 16, 951; ²*Brit. Med. Jour.* 1923, i, 570; ³*Ibid.* 1922, ii, 783; ⁴*Lancet*, 1923, i, 696; ⁵*Médecine*, 1923, Jan., No. 4; ⁶*Brit. Med. Jour.* 1922, ii, 1256; ⁷*Sylo méd.* (abstr. in *Jour. Amer. Med. Assoc.* 1922, Dec. 16, 2123); ⁸*Jour. Amer. Med. Assoc.* 1922, Oct. 21, 1417; ⁹*Ibid.* 1923, Feb. 17, 518; ¹⁰*Jour. of Radiol.* 1922, iii, 521; ¹¹*Jour. Amer. Med. Assoc.* 1922, Oct. 7, 1216; ¹²*Ibid.* July 29, 355; ¹³*Ibid.* Sept. 23, 1030; ¹⁴*Presse méd.* 1923, Feb. 3, 112; ¹⁵*Jour. Amer. Med. Assoc.* 1923, Jan. 20, 160; ¹⁶*Lancet*, 1922, ii, 607.

EYE, GENERAL THERAPEUTICS OF. *A. Bernard Cridland, F.R.C.S.E.*

Acute Ocular Inflammation.—In an abstract of recent progress in ophthalmology by Terrien,¹ a case of Dor's in which sympathetic ophthalmia was cured by large doses of Sodium Salicylate. Arsphenamine treatment has been extolled by some in this condition, but Morax finds that its efficacy is only relative even at the best.

[The treatment of acute ocular inflammations by large doses of sodium salicylate was put forward a number of years ago by H. Gifford, of Omaha. The amount given is 1 gr. for every pound of the body weight in twenty-four hours; thus a ten-stone patient would receive 140 gr. in that period. The patient is kept in bed and the treatment continued for three or four days. As a rule no signs of salicisms appear and the patient experiences no discomfort. The method has been found of considerable value in acute iritis, iridocyclitis, and choroiditis, in the reviewer's experience, but he has met with little success in sympathetic ophthalmia.—A. B. C.]

Glaucoma.—Charlin found syphilis in 20 out of 24 persons under 50 with glaucoma. It was unmistakable also in 35 of 75 of all ages, and probable in 7 others. In the 42 glaucoma cases with syphilis there was aortitis in 32 and general high blood-pressure in 28. In 2 of the younger men the glaucoma was cured by Treatment for Syphilis, although nothing abnormal except the glaucoma could be discovered in the eyes. In 25 non-syphilitics, all over 50, the blood-pressure was high. He affirms that glaucoma in 90 per cent of the cases must be regarded as the localization in the eye of some general vascular process. Its other manifestations are aortitis, arterial hypertension, and chronic nephritis. Abadie has also reported recently the cure of glaucoma under treatment for syphilis in subjects between 30 and 40. Bailliart warns that the spontaneous arterial pulse, noted in 19 per cent of the cases, indicates some pronounced disturbance in the circulation in the retina. Magitot was able to reduce the tension in the eyes of rabbits by intravenous injections of hypertonic solutions. Terson succeeded in reducing the tension in a case of glaucoma by pericocular injection of 2 c.c. of air. The man had been operated on for glaucoma and it had recurred, causing total blindness in the previously better eye. A few days after the injection the man was using the eye in reading.

Tuberculosis of the Eye.—Krull² writes on the effect of Roentgen and Radium Rays in ocular tuberculosis. Improvements were chiefly obtained in lesions of the anterior part of the globe and in the conjunctiva. He has observed no injury to other parts of the eye with the exception of a slight necrosis of the cornea which soon healed.

Ocular Anaesthesia.—Using retrobulbar injections of Procain-Epinephrin, Fromaget³ obtains perfect anaesthesia for operations. A clarification of the cornea was noted in several cases, whilst in a case of glaucoma a fall in tension was observed. The injection consists of a 2 per cent solution of 'Allocaïn', containing two drops of epinephrin per cubic centimetre, 3 c.c. being injected.

REFERENCES.—¹*Jour. Amer. Med. Assoc.* 1922, Nov. 25, 1884; ²*Ibid.* 1923, April 28, 1279; ³*Jour. de méd. de Bordeaux*, 1922, July 25, No. 14.

1. The first part of the document is a list of the names of the persons who have been appointed to the various offices of the city of New York.

2.

3. The second part of the document is a list of the names of the persons who have been appointed to the various offices of the city of New York.

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PLATE XX.

SURGICAL TREATMENT OF
FILARIASIS
(Cf. POWELL CONNOR)



Fig. A. Calicited guinea-worm infestation diagnosed as chronic rheumatism of the ankle-joint.

MEDICAL ANNALS, 1874



Fig. B. Another case diagnosed as chronic traumatic synovitis of the knee-joint.

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FAT EMBOLISM. (See EMBOLISM.)

FIBROIDS OF THE UTERUS. (See UTERUS.)

FILARIASIS.

Sir Leonard Rogers, M.D., F.R.C.P., F.R.S.

B. J. Courtney¹ writes on filarial disease in Northern Nigeria, where in 42·4 per cent of 172 men whose blood was examined between 6 and 10 p.m. microfilaria were found, *M. loa* being distinguished from *M. bancrofti* by prolonged hæmatoxylin staining showing the tail nuclei to extend to the end of the organism, and by their ungraceful wavy lines. *M. bancrofti* was met with about three times as frequently as *M. loa*. Zen Kawakami² discusses the disease in Japan, where the disease suddenly becomes much more frequent between 13 and 17 years of age in both sexes at the time they commence field work. He thinks the infection may be water-borne, as Manson originally suggested, as well as carried by mosquitoes. S. K. Roy³ records researches carried out with the abundant material available at Puri, India, and describes a case in which in clear lymph oozing from a lymph scrotum he found segmenting and developing ova from an early segmented stage up to one in which active *M. microfilaria* stretched the shell of the ovum into much elongated forms, similar developed ova also having been found in the lymph of a case of inguinal varicose lymph glands. The first patient had suffered from periodic fever and lymphangitis of the scrotum, which stopped when the oozing of lymph began, but commenced once more on the diseased scrotum being removed. He⁴ found 27·3 per cent of the Puri population harboured microfilaria in their blood, and about 28 per cent showed clinical manifestations, while 34 per cent of *Culex fatigans* were infected with them.

TREATMENT.—S. K. Roy⁴ also records further experience of the Tartar Emetic treatment of filariasis, which has been used successfully at Puri for the last four years. It is essential to give daily doses, except for occasional omissions if sickness occurs, of from 5 to 10 c.c. of a 2 per cent solution, which accounts for the published failures in a few cases in which deficient dosage was used, and he tabulates eight cases in which from 20 to 100 and even 300 organisms were repeatedly present in a small measured quantity of blood, but were reduced by the treatment to from 0 to 6, and remained so for considerable periods.

Fifty cases of elephantiasis were also treated, with improvement in every one, a reduction of as much as two inches in the circumference of a limb being sometimes obtained, while cases of filarial fever and lymphangitis were much benefited, the fever being stopped for as long as six to eight months in some, although not permanently arrested in the majority.

F. P. Connor⁵ records some experience on the Surgical Treatment of filarial disease, and he found Kondoléon's operation of most use in elephantiasis of the leg, while in that of the scrotum he has used the oedematous skin over the dorsum of the penis, after paring it down to the normal thickness with a razor or curved scissors, to cover that organ again with success.

Filaria Mediensis.—F. P. Connor⁶ describes, and illustrates with reproductions of X-ray plates, the appearance of the calcified remains of this worm in human tissues, usually near the ankle or knee (see Plate XX), giving rise to symptoms which have been mistaken for chronic rheumatism, synovitis of the knee-joint, periostitis, and sciatica, and which it is sometimes advisable to remove to relieve such symptoms.

REFERENCES.—¹*Jour. Trop. Med. and Hygiene*, 1923, March 15, 87; ²*Japan Med. World*, 1922, Sept. 15, 251; ³*Ind. Med. Gaz.* 1923, Feb., 56; ⁴*Ibid.* Aug., 281; ⁵*Brit. Jour. Surg.* 1922, Oct., 253; ⁶*Ibid.*

FLAGELLATE DIARRHŒA. *Sir Leonard Rogers, M.D., F.R.C.P., F.R.S.*

W. E. Musgrave¹ records his experience of intestinal flagellate infections in the Philippines. The most important is *lambliasis*, due to the *Lambliæ intestinalis*, which was found over 1500 times in his hospital records, and gives rise to intermittent diarrhœa, most frequently seen in children, and probably due to direct food infection with the cysts through the mouth; it may possibly be carried by the house fly, although the parasite may occasionally be found in the respiratory tract, indicating inhalation of the cysts. It appears to produce a catarrhal condition of the small-intestine mucosa, resulting in a chronic relapsing diarrhœa very difficult to cure completely, and easily recognized during the attacks owing to the abundance of the flagellates in the stools.

Trichomoniasis is due to infection of the intestine, stomach, air-passages, vagina, or bladder by various species of trichomonas. Its pathogenicity has been disputed, although when present in large numbers it may produce diarrhœa, while Escomel, in Brazil, has reported 152 cases of dysentery in children which he attributed to this parasite, and he infected rabbits from both cultures and the infected secretions of patients. It has also been found in chronic bronchitis with bronchiectasis and cystitis, in females chiefly.

Tetramitiasis, due to another flagellate, is considered harmless by many tropical authorities, but Musgrave thinks it may also cause diarrhœa.

TREATMENT.—Many drugs have been tried in these infections with little benefit, but Musgrave recommends enemas of 1–2000 Thymol, and 0.25 to 0.5 grm. doses by the mouth, as of most value.

H. E. Whittingham³ also holds that flagellates can produce dysenteric symptoms followed by neurasthenia, having met with 22 *Lambliæ* infections; 50 per cent could be cured by prolonged hospital treatment by Purgatives, Thymol, Emetine Bismuth Iodide, and Lavage.

REFERENCES.—¹*Jour. Amer. Med. Assoc.* 1922, Dec. 30, 2219; ²*Brit. Med. Jour.* 1923, i, 799.

FOLIE À DEUX.

C. Stanford Read, M.D.

Folie à deux is a comparatively rare occurrence. Rhein¹ gives brief reports of four cases, and surveys the current views held on it. He defines it as "a mental disorder which occurs in two or more individuals who are intimately associated with each other, in which the delusions, principally of persecution, appear to be transmitted from one to another in individuals who are predisposed". Two interesting cases are also recorded by Gillespie.² These were brothers who both developed a manic-depressive psychosis about the same time. In the one case the psychosis was essentially of the manic type, in the other it was depressive; in the one the psychosis recurred, in the other there was no marked recurrence; and their respective adjustments were markedly in contrast, these differences closely paralleling the difference in their types of psychosis.

REFERENCES.—¹*N. Y. Med. Jour.* 1922, Sept. 6; ²*Jour. of Neurol. and Psychopathol.* 1922, iii, 269.

FOOD POISONING FROM TINNED GOODS.

Joseph Priestley, B.A., M.D., D.P.H.

Sir William Willcox says: "We used to think that there was a danger of poisoning from eating tinned food, because of the food becoming contaminated with tin, lead, or copper; but we now know that, in the present day, tins are so carefully made, and the composition of metal is such, that the danger of metallic poisoning from the eating of tinned food is practically nil; I have never met with a case in a fairly large experience of food poisoning."

The war-time experience with canned goods was astounding, in that no single authentic case of food poisoning was reported officially as having arisen from the canned food being poisonous when it was in the unopened tin. The comparatively few outbreaks of food poisoning (bacterial) that were reported officially during the Great War were four in number—three in France and one at Port Said; three were due to contamination by the *Bacillus aertrycke* and one was due to the *B. enteritidis Gaertneri*; but in all the four cases such contamination occurred during the process of manipulation of the respective meats and milk involved—a contamination from a human ‘carrier’ engaged in the preparation of the foods for the troops, e.g., making of pies, stews, gravies, milk puddings, etc. Many millions of troops were fed regularly for years on tinned foods, practically without a single case of food-poisoning. Complete sterilization in the tinning of foods is not obtained, though the heating process employed kills off almost all the organisms. Indeed, complete sterilization, or over-sterilization, of foods might prove harmful from a dietetic point of view by killing or destroying the so-called vitamins or accessory food substances that appear to be so essential to health.

FOODS, PRESERVATIVES AND COLOURING MATTERS IN.

Joseph Priestley, B.A., M.D., D.P.H.

The Minister of Health has appointed a strong committee to consider and report upon the important subject—important scientifically, medicinally, and economically—of the use of chemical preservatives and colouring matters in foods. Committees have been appointed in the past and have reported, but, practically, nothing has been done by the Government. It may be that such delay has been a benefit to the nation, which has gained in practical knowledge, in recent years’ experiences, as to the value, if not actual necessity, of the judicious addition of preservatives to foods, which are imported in large quantities from abroad. Britain cannot feed herself from within, so that the food supply must be supplemented from without. Tinned, canned, and bottled goods are therefore a *sine quâ non*. Such goods must be, on arrival, fit for human consumption, i.e., unfermented and undecomposed. How can this be effected? By the scientific addition of antiseptics, in the *minimum* quantities required to prevent or retard fermentation and decomposition. This is a scientific problem that can be solved. The Committee appointed would do well to admit the necessity and to devote its energies in laying down standards for *minimum* amounts of antiseptics to effect their purpose.

The wholesale distribution of canned or tinned or bottled foods throughout Britain (and other countries), without any proved deleterious effect upon the consumers, goes to show that common sense must be used in dealing with the subject of preservatives in food. *Minimum* quantities only of such preservatives must be used to effect their purpose. A trace of boracic acid is certainly better than a big dose of bacterial poisons. That really is what the matter resolves itself into. Canned and tinned and bottled foods are a necessity for Britain, so that preservatives become an equal necessity, unless some other practical means can be devised, e.g., sterilization or refrigeration (which effect the same purpose, viz., the arrest of fermentative or decomposing processes). It goes without saying that preservatives of a chemical nature, when used, should be declared on the labels, together with particulars of the quantities used. Many preservatives of a chemical nature are in use, e.g., borax and boracic acid, salicylates, benzoates, formic aldehyde (formalin), sodium chloride, vinegar, alum. sulphate of calcium, chloride of ammonium, saltpetre, sulphurous acid, bisulphate of lime, spirits of wine, etc. The whole question is the amount (minimum amount) to be used in each case.

Milk, all agree, should be chemical-preservative-free, as also the various invalid and infant foods, and the 1899 Departmental Committee so reported. It will be interesting to see what the 1923 Committee will report. One member of the Committee has already advertised widely his personal views on the subject of the use of preservatives in food (with their alleged cumulative effects), but has since resigned from the Committee. His views appear to be somewhat extreme, and, unless the author of them is prepared with a constructive policy—an alternative method for the necessary preservation of canned, tinned, and bottled foods with preservatives or antiseptics of a chemical nature, would not have been of much practical use to the Committee. The whole subject has become a much more far-reaching one than in 1899, with the British Colonies linked up, as they now are, with the British Isles. It is unthinkable that a Committee should report in any way that is likely to affect adversely the present enormous import trade that exists in tinned, canned, or bottled meats, fruits, vegetables, etc., from various parts of the British Empire. There is no proof that any injury, or even danger, to health has resulted therefrom in the past; but, on the contrary, there is reasonable ground for stating that such trade in foods has benefited the consumers. Again, the immense experiment that had to be made during the Great War has conclusively proved that any danger (if danger there be at all) is a negligible quantity. All that is needed appears to be to standardize, not only chemically but physiologically, the various preservatives in common use by the trade to-day, with a view to fixing maxima, or, what is more important, minima, of preservatives that will effect the arrest of bacterial growths and consequent fermentation or decomposition.

With regard to *colouring matters* in food, little requires to be said. The use of injurious colouring matters has cured itself: it is now practically non-existent. The necessary coloration is imparted in the case of sweets and confectionery by heating the sugar to various degrees of heat or by adding saffron, logwood, cochineal, chlorophyll, annatto, turmeric, etc. Mineral and metallic salts and harmful aniline dyes are now rarely, if ever, used. The copper sulphate green colouring process for preserved vegetables is still in use. In practice, the amount used must be small; otherwise, the excess of copper will combine with the proteid matter to form copper leguminate, which is useless for colouring purposes. The green coloration required is due to the phyllocyanate of copper, the acid radical (phyllocyanic acid) being derived from chlorophyll. The smallest quantity of copper sulphate (if used at all) is alone necessary—not exceeding 2 gr. to the pound. Other countries prohibit the use of copper sulphate as a colouring agent, and the 1899 Committee recommended a similar course of action for Great Britain to follow.

While dealing with the preservation of foods, reference may be made to the recently-suggested *laying-on of 'cold'* to private houses in the same way as gas, water, and electric light and wireless are laid on—household refrigerators.

Boric Acid in Cake.—The Ministry of Health has thought fit to issue an official circular (No. 381), dealing with boric acid in cake, on account of the communications that have been received from a number of local authorities. Sponge cake is the worst offender, and, as sponge cake is an article of diet of invalids and children, the intervention of the Ministry of Health appears to be called for. The sources of the boric acid is, chiefly, liquid whole egg, a material manufactured from imported egg yolks, preserved by means of boric acid and dried egg-albumen. Sponge cake includes sponge fingers, sponge biscuits, and 1d., 1½d. and 2d. plain sponge cakes. The Bakery Allied Traders' Association, which appears to include most of the firms manufacturing or trading in whole egg, have passed certain resolutions which will reduce the amount of boric acid in whole egg, and therefore, indirectly, in sponge cake, considerably. Every

member of the association, by bond, has given an undertaking that, on and after Feb. 22, 1922, he will not manufacture nor import liquid whole egg containing more than 1 per cent of boric acid, nor purchase new season's yolks for shipment containing more than 1.5 per cent of boric acid. The association passed a further resolution under date of Feb. 1, 1923, calling upon the members to sign a bond to the following effect: (1) Liquid whole egg must not be used in the manufacture of sponge fingers, sponge biscuits, and 1d., 1½d., and 2d. plain sponge cakes; (2) That all invoices should bear a statement to the buyer to that effect.

FOREIGN BODIES IN EYE. (*See EYE AFFECTIONS.*)

FOREIGN BODIES IN RECTUM. (*See RECTUM.*)

FRACTURES. (*See also CRANIAL SURGERY.*)

E. W. Hey Groves, M.S., F.R.C.S.

The relative advantages of open operation and of other methods in the treatment of fractures of the long bones have been discussed often, but the matter has by no means been settled. The fact appears to be that there are several excellent ways of treating any fracture, and that if a particular surgeon or surgical clinic adopts one method and specializes in that method, then good results will be obtained. Young¹ has collected all the cases (693) in his own clinic which have been treated during five years. In the first year only 8 per cent of the cases were treated by open operation, whereas in the last year of this period over 30 per cent were operated upon. He states that as the operation for fracture is a most laborious undertaking, the fact that it is employed now four times as frequently as formerly is a strong argument that experience has shown it to be worth while. As regards the type of cases operated upon and the kind of operation done, there are several points of practical interest and importance. Wiring is still used extensively (20 per cent), and great importance is attached to the use of strong brass wire instead of brittle silver wire. The cases for which this method was used were chiefly the jaw, olecranon, and patella. The use of fine metal nails in fixing broken portions of the epiphyses, or even of the shaft, is commended as simple and accurate. Plating (chiefly for the femur and humerus) is still employed frequently (almost 50 per cent of the operations). No mention is made of the use of bone pegs or plates by this author, who is satisfied with the metallic materials used for bone suture.

Fractures of the Neck of the Femur.—Work on this subject continues to be done each year on two different lines. First, that of Whitman and his school, who consider that fixation of the hip in full abduction should be regarded as the method of choice; second, the different types of open operation or pegging.

Whitman² insists on the great importance of the early recognition and treatment of cases of slipped epiphysis of the femur, so that a real *restitutio ad integrum* may be achieved, instead of waiting until coxa vara has resulted, and then treating this by osteotomy. In cases of slipped epiphysis the patient is generally a stout child or adolescent, and the first fact in the history is a comparatively trivial injury or strain which causes a little limping, together with pain and limitation of the movements, which are often regarded and treated as rheumatism. The X-ray picture, however, shows that on the affected side the epiphysis is lower than normal. If the nature of the case is recognized in this early stage, it may be corrected by forcible manipulations and fixation in full abduction (*Plate XXI, A, B*). If further deformity is allowed to occur, an operation may be necessary in which an osteotomy of the neck just distal to

the epiphysis is done so as to allow of abduction. In this way, by placing the corrected limb in full abduction in a plaster spica, strain is taken off the neck, and walking in the plaster may be allowed, because the weight of the body is taken by the trochanter instead of by the neck of the femur.

Opinions as to the possibility of good bony union in fractures of the proximal part of the femoral neck differ very greatly. In the older text-books the distinction is made between the intracapsular fracture of old people and the extracapsular fracture of the young and middle-aged, and it was taught that only the former type of fracture showed a tendency to non-union. But this teaching, which is acknowledged now to be very inaccurate, still rather dominates the present-day practice. The fact is that any fracture of the neck of the femur—i.e., when the line of fracture is proximal to the trochanter—may occur at any age and is always very liable to non-union. Whitman says: "In spite of the development of the abduction method of treatment, we may assume that a certain number of transcervical fractures will not unite. In determining this proposition, we may range between the reports of Campbell, who obtained union in 85 per cent of this type of fracture, and Delbet, who states that such fractures never unite under any form of treatment."

Axhausen³ makes a very interesting observation showing that in some cases, even when bony union has occurred, extensive necrosis has taken place in the proximal fragment. He believes that in the majority of these fractures the head and neck undergo quiet aseptic necrosis. This does not necessarily prevent union, although it is a big factor in the promotion of non-union. But even if union does take place, the nutrition of the head of the bone is likely to suffer, causing sooner or later destruction of the articular cartilage and osteo-arthritis.

Bonn,⁴ working with Schmieden, advises the adoption of a very radical method of treating fractures of the femoral neck. The capsule of the joint is to be exposed and opened, and, if the inner portion of the capsule is found to be torn through, it is assumed that the proximal fragment is incapable of useful existence, and it is removed. But if the reflected portion of the capsule is found to be intact, then a nailing operation is done. This suggestion of removal of the head of the femur for fractures of the neck was made and practised by Kocher as long ago as 1896. The fact that such a mutilating operation should have been advised so long ago, and that it is still advocated, is a startling commentary on the bad results which occur after the other methods of treatment.

Bonn describes Schmieden's operation, in which, when complete separation of the head of the femur has been proved, the proximal fragment is removed, and the great trochanter is shortened, rounded, and placed in the acetabulum. In young patients a movable joint is expected, but in the older the cartilage of the acetabulum is removed so as to obtain ankylosis (*Plate XXI, C, D*).

Wilensky,⁵ in comparing the three methods of treatment, viz., that by traction, plaster abduction, and open operation, has nothing good to say for the first, considers that the second is tedious and uncertain, and that the third should be the method of choice in all suitable cases. He lays great stress on one very important point, which is that, soon after the fracture, the proximal fragment undergoes atrophy or absorption, so that unless the operation is done soon after the accident it is impossible to obtain a perfect result. He describes two very instructive cases in illustration of this point. In the one, a man of 48 had had a fracture of the neck of the femur of two years' standing, and in spite of treatment by a plaster spica for six months he was still suffering from non-union. The operation of pegging was done, and although he got a fair functional result with bony union, he remained a lame man,

PLATE XXI.

FRACTURES



Fig. A.—Epiphyseal displacement in a boy four years of age, illustrating the progression of the deformity.



Fig. B.—After reduction. Taken through the plaster spica. Contrast with *Fig. A.*

(*Figs. A, B from the 'Annals of Surgery'.*)



Fig. C.—Fracture of femoral neck, before operation.



Fig. D.—Same case as in *Fig. C.* after operation. The proximal fragment has been removed and the great trochanter inserted into the acetabulum.

(*Figs. C, D from the 'Archiv für klinische Chirurgie'.*)

PLATE XXII.

FRACTURE OF NECK OF FEMUR

(A. O. WILKINSKY)



Fig. A.—Skiagram of the first case, taken after operation.



Fig. B.—The second case, taken about two months after operation.

By kind permission of 'Annals of Surgery'

because the neck of the bone had been lost. In the other patient, a boy of 14, the operation was done four months after the accident, and produced a complete anatomical and functional recovery. (*Plate XXII.*) He recommends an antero-external incision, with exposure but no opening of the capsule. A graft is cut from the shaft of the femur itself and driven into the neck.

Fractures of both Forearm Bones.—These injuries have always presented a difficulty in treatment, and there is no general agreement among surgeons as to the best method in the complicated cases.

In Holland, Noordenbos has for some time been using a method of double transfixion, and Koopmans⁶ describes the results of this in eight consecutive cases. The method consists in the simultaneous transfixion of the lower ends of the ulna and radius, and of the olecranon, by fine steel pins 2 mm. thick, and on to each of these pins weight extension in the opposite direction is applied whilst the patient is kept in bed (*Fig. 44*). The pins are removed after three or four weeks. The author claims that, the joints being allowed full freedom whilst efficient traction is applied, the functional results are more perfect and recovery is more rapid than in any other method.

BONE-GRAFTING.

The complex problem of bone repair and transplantation continues to receive close attention, both from the laboratory and clinical workers. Haas⁷ has furnished a very interesting and instructive experimental research dealing with the phenomena of repair in transplanted bones. He did the work on dogs, the majority of which were full grown. In the first series of cases one of the metacarpal bones was removed, fractured, and then replaced in its bed, thus depriving it of its normal blood-supply. The fractured bone nevertheless united in a normal manner by means of callus thrown out by the fractured ends. This experiment demonstrates that complete deprivation of its original blood-supply will not cause non-union of a fracture. The conditions of the experiment, however, make it easy for the establishment of a new circulation. It does not prove, therefore, that when a portion of bone is cut off from its circulation and is so placed that new vessels cannot grow into it, as in the head of the femur, repair will be normal. In the second series of cases the fractured metacarpal was transplanted into the muscles of the back. Under these circumstances, too, callus union took place, but only slowly and feebly. If the transplanted bone was boiled, then no union or bone formation occurred, but on the contrary gradual absorption of the bone took place. This shows that the callus union in a live graft is due to its own vital cellular activity, and not to the ingrowth of cells from its living bed. Lastly, a bone was removed and fractured, and one half was boiled. The bone was then put back and implanted in the muscles. Union took place at the seat of fracture, although the boiled portion of the bone was partly absorbed.

Goljanitzki⁸ has made a contribution to the problem of treating old traumatic gap-fractures in which there exists either a small or large interval

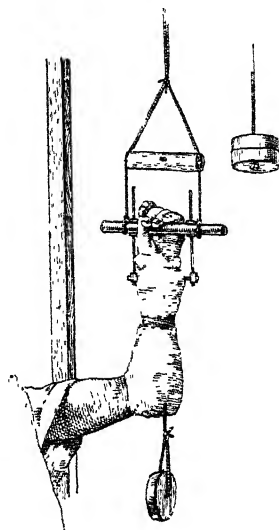


Fig. 44.—Noordenbos's method of double transfixion for fractures of the forearm. (*Reidunn from 'Surgery, Gynecology, and Obstetrics'.*)

between the sclerotic ends. His first suggestion is the same as was described by Waring and Milligan, and noted in last year's MEDICAL ANNUAL. It consists in exposing the fracture, dissecting out the fibrous scar-tissue, comminuting the ends of the original bones, and either impacting these or filling the gap with bone chips. In the other method, which is more novel, he deals with a large gap in which there is much unhealthy scar tissue. This method he describes as 'collateral restoration'. For example, in a radius with a gap of 6 cm., he exposes the whole bone and divides it above and below near to the epiphyses. The damaged shaft and the scar tissue are pushed aside, and a piece of fibula is placed between the epiphyses, so as to effect union with healthy and vascular bone. This is only carrying to an extreme the generally received principle of cutting out the unhealthy scarred bone-ends and putting the graft into contact with healthy bone; but it has this practical merit, that the large section of inactive bone is left *in situ*, and the scar tissue is not disturbed.

Mitchell⁹ records the results of 100 consecutive cases of ununited fracture of the long bones due to gunshot injuries. These results are remarkably good, and testify how much progress may be made by persistent care and learning from experience in dealing with a most difficult problem. The bones concerned, and the general results obtained, are seen in the following table:—

Bone			Operated	Successes	No Operation
Ulna	..	..	30	30	6
Radius	..	..	22	20	4
Humerus	..	..	19	16	0
Tibia	..	..	14	10	4
Femur	..	..	1	1	2
Fibula	..	..	0	—	1

The method of treatment usually adopted was the use of a long autogenous graft cut from the surface of the tibia so as to include a portion of the medullary tissue. After waiting for a year or more for the subsidence of sepsis, and in some cases after a preliminary operation for the removal of scar tissue, the grafting is performed. Unhealthy bone is removed from the seat of fracture, and the two bone-ends are exposed for a long distance above and below the gap. They are then grooved deeply so as to expose the marrow cavity. A long tibial graft is cut, and this must be long enough to establish contact with the host-bone for a considerable distance above and below the gap. The graft is fixed in place by sewing the soft parts over it by means of tanned catgut. The limb is fixed in plaster-of-Paris for at least six weeks. As one of the essentials of this technique it is stated that the graft should be as thick and strong as the bone that it has to replace, so that it is evident that in this respect it can only apply to cases of fracture of the radius and ulna. In the humerus, tibia, and femur, recourse has to be made to intramedullary grafts, double grafts, step-cut operations, or the introduction of fragments of bone. (Plates XXIII, XXIV.)

Delagenière,¹⁰ who since 1916 has been using thin grafts consisting of periosteum with thin scales of underlying bone attached, has now summarized his results up to date. He reports 293 cases, of which he claims that 261 have

PLATE XVIII.
BONE GRAFTING

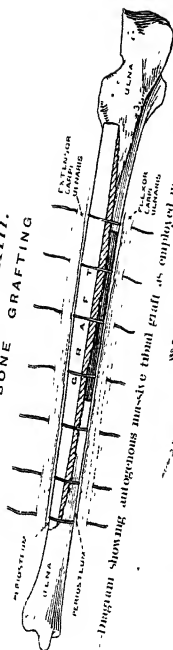


Fig. A.—Diagram showing autogenous muscle-tubal graft employed in ununited fracture of tibia.

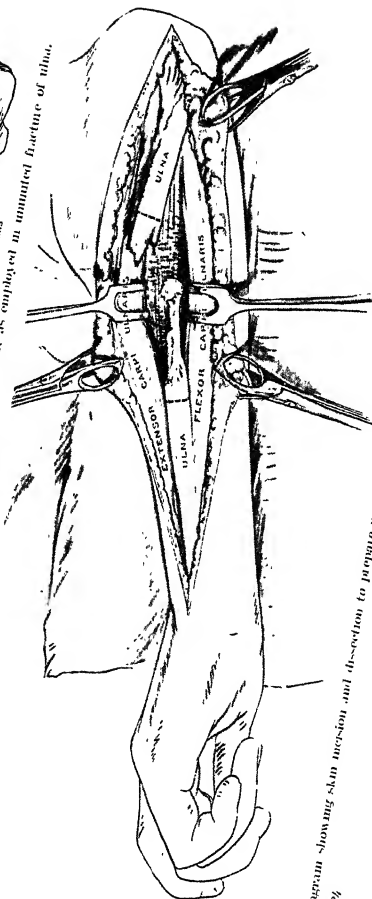


Fig. B.—Diagram showing skin incision and dissection to prepare ununited fragments of tibia and musculotubercles bed for reception of graft.

Fig. A and permission of 'The British Journal of Surgery'.

PLATE XXIV.

BONE GRAFTING—continued

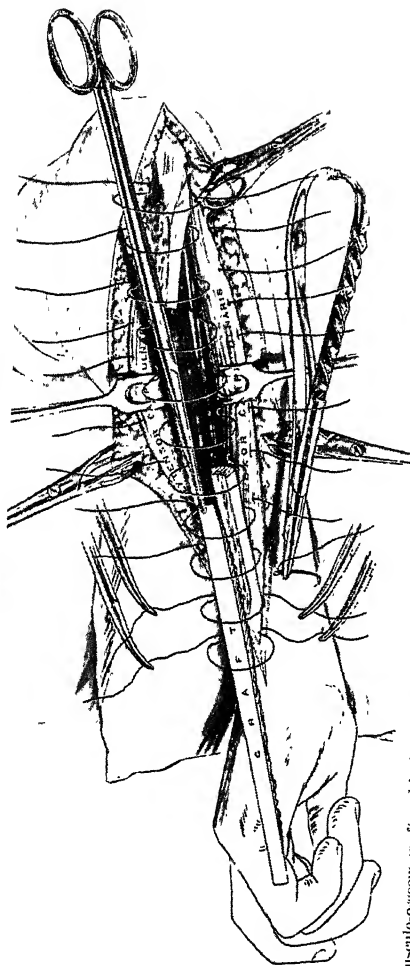


FIG. C.—Diagram of metacarpal-osteous graft and bed on postero-interior surface of ulna completed. Method of placing graft under looped sutures of strong tanned catgut.

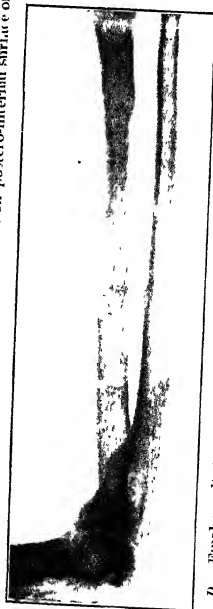


FIG. D.—Final result 20 months after grafting operation for non-union of radius. Metacarpal completely re-formed. Massive fibular graft employed.
MEDICAL ANNALS, 1924

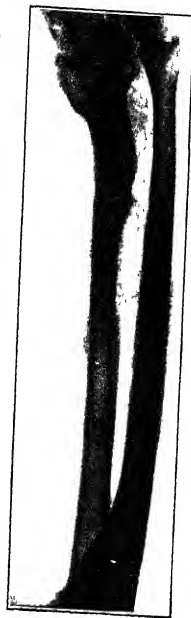


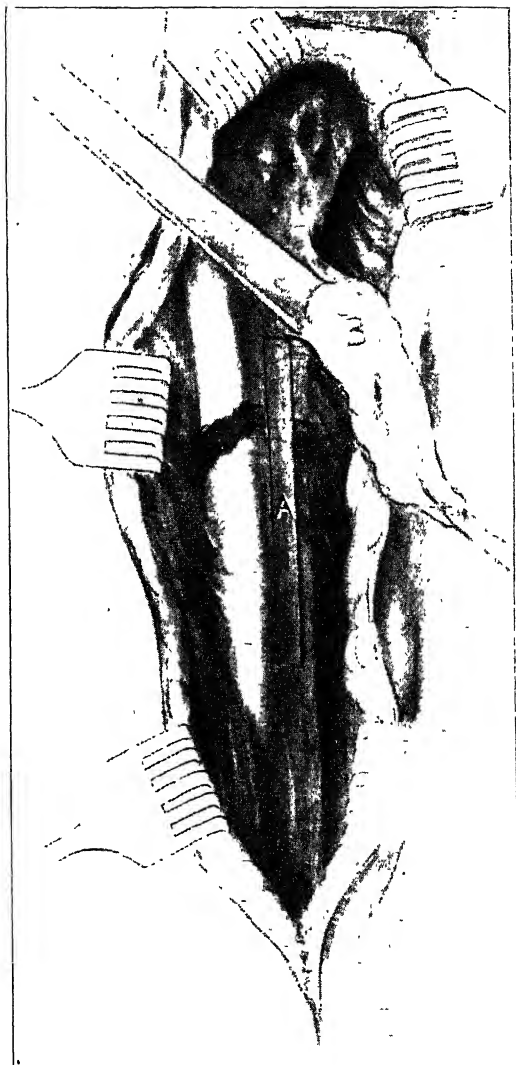
FIG. E.—Final result of fibular graft for non-union of tibia—two years after operation. Combination of graft almost complete.

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PLATE XXV.

WAFER BONE GRAFTS

(H. B. THOMAS)



A, The slightly wider and longer graft, placed in its smaller bed, is wedged in, no pegs, saws, or side clips are needed.

B, Removal of the periosteal wafer graft from the upper inner side of the tibia

Kindly sent by the Journal of the American Medical Association

PLATE XXVI.

WAFER BONE GRAFTS *continued*



The placed wafer graft of perio-femur with its attached compacta. It covers the amputated ends of the ununited fracture.
It also covers the trans-plant as shown in *Plate XXV, A.*

Kendall sent by the 'Journal of the American Medical Association'

been successful, i.e., 86 per cent. His method consists in taking the periosteum from the antero-internal surface of the tibia, using the full width of the bone and the length that may be necessary, and, attached to the membrane, chiselling off the superficial layer of bone about the thickness of a 50-centime piece. This is sutured round the bone which has to be mended, after any other fixation method has been carried out. After a few months a new shell of bone like external callus has been formed, and eventually complete regeneration of bone takes place. Of the 293 cases, 112 are cranioplasties, and 53 jaws. In regard to the long bones the following numbers were treated: femur 3, humerus 17, radius 13, ulna 21, radius and ulna 5, tibia 22. It is exceedingly difficult to form any critical estimate about these cases, because so often the

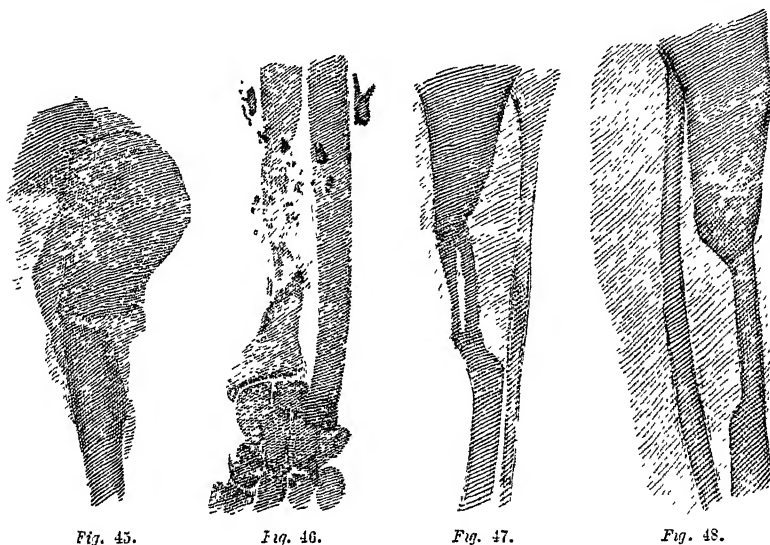


Fig. 45.

Fig. 46.

Fig. 47.

Fig. 48.

Fig. 45.—Fracture of the upper extremity of the humerus, well consolidated in slight abduction to correct the adduction of the upper fragment maintained by the scapulo-humeral ankylosis. Fair functional result, the movements of the scapula compensating for the ankylosed joint.

Fig. 46.—Fracture of the lower third of the radius, with loss of substance. Consolidation in good position with perfect function of the forearm and wrist. The callus indicates the part played by the grafts.

Fig. 47.—Graft of tibia five months after operation. Consolidation is not yet complete.

Fig. 48.—Allée graft consolidated by osteo-periosteal grafts. Radiograph taken one year after operation. Perfectly solid union.

(Redrawn from the 'Archives Franco-Belges de Chirurgie'.)

osteoperiosteal graft was only one part of a more elaborate osteosynthesis. In many cases a gap fracture was treated by means of an ordinary stout graft, whilst the wafer graft was only used to wrap round the points where the graft and host-bones joined. But there were a sufficient number of cases where a real gap of 6 to 8 cm. was bridged by these wafer grafts only, and where eventual consolidation occurred, to prove the efficacy of the method. The wafer graft will not do anything to fix the fracture, and it would seem that it is in cases where fixation by plaster is easy, e.g., the tibia or one of the forearm bones, that the method finds the greatest success (*Figs. 45, 46, 47, 48*).

Thomas¹¹ relates a case in support of the method of applying a thin wafer graft in addition to the more usual form of sliding graft. In this way he claims that more rapid and solid bony regeneration will be obtained (*Plates XXV, XXVI*).

REFERENCES.—¹*Brit. Med. Jour.* 1922, ii, 1209; ²*Ann. of Surg.* 1922, Nov., 624; ³*Arch. f. klin. Chir.* 1922, July 21, 325; ⁴*Ibid.* 298; ⁵*Ann. of Surg.* 1922, Nov., 631; ⁶*Surg. Gynecol. and Obst.* 1922, Dec., 793; ⁷*Ibid.* 1923, June, 749; ⁸*Ibid.* 1923, Feb., 97 (abstr.); ⁹*Brit. Jour. Surg.* 1922, Oct., 259; ¹⁰*Arch. Franco-Belges de Chir.* 1922, May, 673; ¹¹*Jour. Amer. Med. Assoc.* 1923, Feb. 3, 309.

GANGRENE. (*See* EMBOLISM; LUNG, GANGRENE OF.)

GASTRIC ANALYSIS.

Robert Hutchison, M.D., F.R.C.P.

There is little to add to the résumé of this subject given last year. Franklin White¹ confirms the results of those writers who have found that the gastric chyme is not a uniform mixture, and that therefore fractional samples do not accurately represent its composition. He made about 500 analyses of the gastric contents in 50 cases by rapid (half-minute) and slow (fifteen-to-twenty-minute) fractional methods, the position of the tube tip being located by the fluoroscope. He found that the content of the stomach at the end of an hour is not usually of uniform composition, owing to incomplete mixing of acid secretion with the meal. He draws the conclusion that fractional analysis is only a rough method of testing gastric secretion; accidental variation may amount to 50 or 100 per cent of the figures obtained. Only gross changes in acidity, therefore, have clinical importance.

Kopeloff,² extending his work on the subject to which reference was made last year, has also found a wide variation in the acidity of 10-c.c. fractions withdrawn in rapid succession three-quarters of an hour after a test meal; and by inserting three Rehfuß tubes in one individual and aspirating the fractions simultaneously at fifteen-minute intervals, considerable variation of acidity in different parts of the stomach at the same moment was found.

Pemberton,³ on the basis of 200 test meals in various conditions of disease, comes to the cautious conclusion that "by comparison with other methods the fractional test meal is at least admissible as an aid to diagnosis". On the other hand, McVicar,⁴ from his large experience in the Mayo Clinic, definitely states "that it has not been found that fractional curves have any precise diagnostic values, and the procedure has been abandoned without prejudice to its further use in physiologic or pathologic research".

Notwithstanding the fact that the trustworthiness of the fractional method has been rather blown upon, investigators in this country continue to publish the results yielded by it in large numbers of cases. Hunter,⁵ for instance, has given an analysis of the findings in 174 cases verified by operation or autopsy. The results are pretty well those with which we have long been familiar. Chronic duodenal ulcer gave a constantly high acidity; chronic pyloric ulcer a less constantly high curve; whilst in ulcer of the body of the stomach there was no constant finding. Gastrojejunostomy was found to abolish free HCl in 45 per cent of the cases examined. [This should be noted by those who have asserted that the operation has no effect on the acidity.—R. H.] Of 9 cases of chronic appendicitis, the curves were within the normal limits in 78 per cent. Seven cases of gall-stones were investigated, and in 88 per cent the curves were normal. He also found that a prolonged secondary anæmia, such as may be produced by repeated small hæmorrhages from a duodenal ulcer, may result in achlorhydria. [The reviewer has found the same thing in a case of profound secondary anæmia the result of bleeding piles.—R. H.]

Bell⁶ reports upon 243 analyses in various diseases. There is nothing really

new in his conclusions, but he found no evidence that—as has sometimes been asserted—the acidity of the gastric secretion tends to become less with advancing age. Women preponderated over men in the lower curves, which means that a moderate degree of superacidity is more significant in a woman than in a man. He found no evidence for what he alleges is the ‘general belief’ that when free HCl is absent the stomach empties much more rapidly than normal.

Some interesting work has been published on the effect of drugs and other agents on gastric function as measured by fractional analysis. Lockwood and Chamberlin,⁷ for instance, have found that the administration of one ounce of olive oil before meals causes a reduction of the average acidity and a lowering of the high point of acidity about 12 per cent. It also delays evacuation by forty minutes, and leads to a regurgitation of bile into the stomach in 80 per cent of cases. The same authors⁸ found that maximal clinical dosage with atropine lowers both the free and total acidity about 30 per cent, and delays evacuation by about ten minutes.

Bennett⁹ has confirmed these results as regards atropine. He finds that the maximum effect is obtained by giving the drug in small doses on an empty stomach and well diluted, so that it comes directly into contact with the mucous membrane. He also found that sodium bicarbonate tends to excite secretion, and that this effect more than counterbalances its neutralizing power. He found no marked effect of the bitters on gastric function. Strychnine, to produce any effect on atony, should only be given in very small doses. On the whole these results confirm general clinical experience.

REFERENCES.—¹*Jour. Amer. Med. Assoc.* 1922, Oct. 28, 1499; ²*Arch. of Internal Med.* 1922, July, 118; ³*Brit. Med. Jour.* 1922, July 1, 7; ⁴*Canad. Pract.* 1923, April, 137; ⁵*Quart. Jour. Med.* 1923, Jan., 95; ⁶*Guy's Hosp. Rep.* 1922, July, 302; ⁷*Arch. of Internal Med.* 1923, Jan., 96; ⁸*Ibid.* 1922, Dec., 806; ⁹*Brit. Med. Jour.* 1923, i, 366.

GASTRIC AND DUODENAL ULCER. (See also STOMACH, SURGERY OF.)

Robert Hulchison, M.D., F.R.C.P.

To the constantly recurring question—is cancer often associated with gastric ulcer?—MacCarty,¹ on the strength of the examination of more than 1400 gastric specimens at the Mayo Clinic, replies as follows: “I can state that the association is so frequent that if I had a chronic gastric ulcer I should always consider the possibility of cancer being present, and I know of no clinical or laboratory methods by which the differential clinical diagnosis can be made. From actual experience also I know that most chronic gastric ulcerations with a diameter greater than 2·5 cm. are cancerous. I do not know whether the cancer or the ulcer was primary, but I do know that I would not temporize with the chronic gastric ulcer.” On the other hand, John Morley,² after a careful examination of 60 cases of chronic ulcer treated by operation and 56 cases of clinically-proved cancer, comes to an exactly opposite conclusion—namely, “that a patient with a chronic simple ulcer of the stomach is little, if at all, more liable to cancer than a healthy individual.” He finds that about 30 per cent of cases of cancer of the stomach give rise to symptoms which simulate more or less closely those of simple ulcer. He holds that it is this ulcer-simulating cancer which was responsible for the belief in the cancerous degeneration of simple ulcers.

As to the X-ray evidence of the healing of gastric ulcer under treatment, which has lately been much relied upon, Hollander³ points out a possible fallacy: namely, that the apparent diminution or obliteration of the ‘niche’ may not be due to cicatrization but to the crater becoming filled with food, mucoid material, or granulation tissue. He cites cases of his own and others

illustrating these possibilities. Schindler¹ also draws attention to the fallaciousness of X-ray evidence, and believes that the gastroscope alone can provide a satisfactory proof of healing.

TREATMENT.—Hardt and Rivers⁵ draw attention to toxic manifestations following the alkaline (or Sippy) treatment of gastric and duodenal ulcer. Such manifestations are specially apt to appear in cases in which it is found difficult or impossible to control the gastric acidity. The most prominent symptoms are headache, distaste for milk, dizziness, aching in the muscles and joints, nausea and vomiting (often severe), followed by prostration and drowsiness. The urine shows signs of renal irritation (albumin, red cells, and casts). The patients affected were receiving daily 70 gr. of sod. bicarb., 56 gr. of heavy calcined magnesium, and 105 gr. each of calcium carbonate and bismuth carbonate. Because of the persistently high acidity, from 70 to 210 gr. of calcium carbonate were given daily in hourly doses of from 5 to 15 gr. How the alkaline treatment causes these effects is unknown, but there is no reason to suppose that they are the result of a pre-existing nephritis. Which of the salts or metals employed is to be regarded as responsible for the toxæmia is also as yet undetermined. As a rule the symptoms disappear rapidly when the alkaline treatment is stopped and the patient is put on a mixed diet, but one out of six cases recorded by the authors proved fatal. Those who are inclined to adopt the 'alkaline' treatment of ulcer should take note of this danger.

REFERENCES.—¹*Jour. Amer. Med. Assoc.* 1922, Dec. 2, 1928; ²*Lancet*, 1923, ii, 206; ³*Jour. Amer. Med. Assoc.* 1923, Jan. 6, 29; ⁴*Munch. med. Woch.* 1923, April 6, 421; ⁵*Arch. of Internal Med.* 1923, Feb., 171.

GENERAL PARESIS. (See also NEUROSYPHILIS, TABES, AND PARALYTIC DEMENTIA.)

C. Stanford Read, M.D.
Some of the unsolved problems connected with paresis are dealt with by Stewart,¹ who mainly devotes attention to the times of invasion of the nervous system and to the question of the existence of special neurotropic strains of the *Spirochaeta pallida*. The interval between the infection with syphilis and the onset of general paresis was seldom less than six years, and in tabes it was usually longer. This very important time element has not yet had its full significance explained. Recently, however, support has been given to the view that during the period of general dissemination of the disease—syphilis—the spirochaetes in the blood gained access to the brain or its membranes, and lay dormant until a favourable event occurred to facilitate their multiplication. In general paresis the organisms might attack the nervous system because they possess a special neurotropic action, or the disease might make its appearance because the patient possessed a neurotropic disposition. Noguchi and others have studied variations in the biological properties of the spirochaetes, and supporting clinical and epidemiological evidence has been collected. Certain strains were thinner than others, and it was found that these produced large diffuse lesions, while the thicker varieties, which were also less motile, were responsible for hard, nodular, sharply-defined lesions.

From an American statistical study by Furbush² the following outstanding facts concerning general paralysis are summarized: Of all new cases admitted each year to State Mental Hospitals, over one-tenth have this disease. It claims nearly four times as many males as females. The great majority of admissions are in early middle life. A much greater proportion come from urban than from rural communities. A larger percentage of intemperance is found among such cases than for any other form of mental disease except the alcoholic psychoses. It claims for the most part married men and women. It has a low improvement-rate and a markedly high death-rate, but is less severe among women

than men. The need therefore to check the spread of syphilis and apply treatment early becomes patent.

TREATMENT.—The therapeutic possibilities of dealing with general paresis are considered by Solomon.³ He thinks that where the parenchymal degeneration is very slight there is reason to believe that some satisfactory results may be obtained. As to the possibility of destroying the spirochæte, two modes of attack present themselves—viz., the use of antispirochætal agents which will reach the spirochætes in the central nervous system and destroy them, and an increase of immunity reaction on the part of the host. The structure of the nervous system is such that substances put into the blood-stream have great difficulty in reaching the deep-lying tissue. At any rate certain drugs, chiefly the heavy metals, and especially Arsenic, do get into the nervous system, or at least into the cerebrospinal fluid, when introduced into the blood-stream. A recent investigation by Solomon and Taft has shown that antisyphilitic treatment does produce changes in the histological picture in general paresis. The problem is to find the best method of reaching the location of the spirochætes. Possibly, in some cases where there is damage to the choroid plexus, arsenic is allowed to permeate. Aside from the simple intravenous or intramuscular medication, there is a possibility of the direct introduction of drugs into the cerebrospinal fluid system, and it seems that where the effect is desired upon the brain tissue, it is more satisfactory to introduce the drug either into the cistern or, preferably, into the cerebral ventricles. The method of spinal drainage as practised by Dercum must be thought of.

Goodall¹ touches upon the relationship of the therapy by the production of an Artificial Leucoeytosis, and Scripture⁵ deals with the treatment of general paresis by Malaria. Many methods of producing fever artificially have been tried with varying results, but Wagner-Jauregg, quoted by Pilez,⁶ has drawn up a scale of efficiency of the various methods used as follows: (1) Chemical substances (sodium nucleinate); (2) Toxalbumins (tuberculin, staphylococci); (3) Acute disease. The last is the most efficient. The treatment by malaria gives a much higher percentage of remissions. Gerstmann⁷ states that out of observations made in 296 cases, 202 showed remissions of varying degree, 112 showed complete remission with the disappearance of former mental disturbances and a return to former business capacity; that is, 68 per cent showed remissions and 38 per cent complete remissions, and this in spite of the fact that many advanced cases were included. Several German clinics report good results. Weigandt⁸ in 50 cases reports remissions in 88 per cent, and good remissions in 48 per cent. Wagner-Jauregg⁹ goes so far as to say that in cases of short duration entire success can be predicted with almost absolute certainty. Worster-Drought¹⁰ in this country has treated 12 cases of dementia paralytica by means of malarial infection according to Wagner-Jauregg's technique. The first sample of malarial blood was obtained from a case of benign tertian malaria who had not been treated by quinine. Subsequent inoculations were made from the cases of paresis in turn as they developed malaria. It was found that the subjects became just as efficiently infected if the blood was taken at any stage, even between the paroxysms, provided no quinine had been taken. Twelve attacks of malaria were permitted, the infection being terminated by the administration of two intramuscular injections of quinine dihydrochloride in successive doses, and followed by 5 gr. of quinine sulphate daily for a week. No relapses of malaria were observed. Although the malarial infection had passed through twelve cases, it was just as potent after the eleventh case as at first. In 7 cases the improvement in the mental condition towards the end of and after the malarial attacks was very striking, speech, rapidity of conversation, memory, and ability to carry out commands,

etc., all showing a decided advance. One patient, who had no conversation beyond a grunt and who was a profound dement, was able to give details of his naval service at the end of a malarial period. After a week or two he relapsed into his former condition. In four cases no very decided changes occurred. Following the malarial attacks, Worster-Drought thought it advisable to give weekly intravenous injections of novarsenobillon.

Quite another note is struck by Professor Rosenfeld,¹¹ who, though not specifically speaking of general paresis, discusses the relation between mental disorders and infectious diseases. From numerous sources he quotes evidence which, although demonstrating the profound influence acute toxic conditions can have upon a psychotic state, is none the less entirely ambiguous as to the nature and tendency of this influence. He says that the attempt to induce artificial febrile states by malaria and other toxic agencies are in his view not justified by the results. His scepticism even goes so far as to say that the super-added toxin of the fever often seriously aggravates the psychotic phenomena.

REFERENCES.—¹Paper read at Annual Meeting of Med. Psych. Assoc. 1923, July; ²*Mental Hygiene*, 1923, vii, 565; ³*Amer. Jour. Psychiat.* 1923, ii, 623; ⁴*Lancet*, 1923, July 21; ⁵*Jour. of Mental Sci.* 1923, lxxix, 77; ⁶*Lancet*, 1923, Jan. 6; ⁷*Zeits. f. d. g. Neurol. u. Psychiat.* 1923, lxxxi; ⁸*Ibid.* 1922, lxxiv, 242; ⁹*Ars Medici*, 1923, i; ¹⁰Personal communication; ¹¹*Munch. med. Woch.* 1923, lxx, 415.

GENITAL PROLAPSE.

W. E. Fothergill, M.D.

Miles H. Phillips¹ writes on the operative treatment of prolapse associated with conditions requiring hysterectomy. There are cases in which the uterus must be removed by the abdominal route, the prolapse being treated by a separate operation, either at the same sitting or at another time. But in other cases it is feasible to combine vaginal hysterectomy with the modern extensive plastic operations for prolapse. During the last twelve years Phillips has done this in 90 cases. The chief indications have been chronic cervicitis, the bleeding uterus of the menopause, fibroids of moderate size, and intractable senile endometritis. The anterior incision is made first as for Fothergill's combination of anterior colporrhaphy with amputation of the cervix, the large flap of vaginal wall is reflected, and the cervix is freed from the vagina posteriorly and from the paracervical fascia laterally. Then—instead of amputating the cervix—the operator proceeds to open the pouch of Douglas and ligature the uterosacral folds, the ligatures being left long for future use. The uterine arteries are clamped, cut, and tied. The bladder is pushed up and the uterovesical pouch opened. The round ligaments are tied, and, finally, the ovarian pedicles are clamped and the uterus is removed. The pouch of Douglas is now closed with a purse-string suture which picks up the edge of the uterovesical pouch. The ovarian pedicles are sutured together in the middle line. The round ligaments and uterosacral ligaments are next sutured together, all four structures being united in the middle line in some cases. Next the anterior colporrhaphy incision is closed by interrupted sutures, each of which takes a deep bite of the underlying paracolpos. A small gap is left at the top of the vagina for drainage. Finally, a high posterior colpo-perineorrhaphy is carried out by Donald's method. The operation is well borne even by patients of very advanced age, and gives satisfactory permanent results. [The usual number of papers have appeared during the past year advocating various modifications of technique for the surgical treatment of genital prolapse. These are not quoted here, as they suggest no improvements upon the simple methods now well established and in general use.—W. E. F.]

REFERENCE.—¹*Jour. Obst. and Gynaecol. Brit. Emp.* 1923, No. 1, 100.

GERMAN MEASLES. (*See RUBELLA.*)**GLANDULAR FEVER.***J. D. Rolleston, M.D.*

W. T. Longcope,¹ who has seen 10 cases in the last thirteen years, states that the condition known as 'glandular fever', 'infectious mononucleosis', or 'acute benign lymphoblastosis', though not very common, is sufficiently frequent to be of importance from a practical and theoretical standpoint. The etiological agent is unknown. Although Bloedorn and Houghton, who found spirilla and fusiform bacilli in smears from the tonsils in three of their four cases, are inclined to regard the disease as a form of Vincent's angina, Longcope points out that the clinical appearances of the throat and tonsils do not correspond to the picture of Vincent's angina. Cultures from the tonsils and inflamed throat in his cases showed such a diverse flora that no one organism could be incriminated. A few specific infections, such as typhoid, pertussis, malaria, Malta fever, and possibly tuberculosis, and intoxications such as those due to arsphenamine and tetrachloride, may produce a mononucleosis, but the increase in the mononuclear cells in these diseases is not very great and is often insignificant compared with the considerable mononucleosis of glandular fever. This disease has been mistaken for tuberculosis, typhoid, Hodgkin's disease, and leukæmia, and in a few instances syphilis has been suspected, but there is no evidence that the condition is at all related to any of those diseases. From leukæmia, to which it bears the closest resemblance, it is distinguished by the early and marked enlargement of the lymph glands, the absence of anæmia and purpura, and the histological and biological characteristics of the mononuclear cells, the predominant type of which are somewhat larger than the small lymphocytes, and contain oval or kidney-shaped nuclei, usually without definite nucleoli.

H. Letheby Tidy and E. C. Daniel² describe an epidemic of glandular fever which occurred in a school where 24 out of 42 boys reported sick with large glands in the neck, and sore throat. The epidemic was mild, but many of the cases were typical. In none did the temperature rise above 103°, and in only three cases above 102°. In no case was there suppuration, and in only one instance was the spleen enlarged. The fauces were reddened in a good number of cases, and the tonsils were enlarged. Blood-counts which were made in 18 cases showed that absolute lymphocytosis was a general, though not invariable, rule; but the lymphocytosis might be very transient, very slow of development, and not always present at the onset of the illness.

REFERENCES.—¹*Amer. Jour. Med. Sci.* 1922, ii, 781; ²*Lancet*, 1923, ii, 9.

GLAUCOMA. (*See EYE, GENERAL THERAPEUTICS OF.*)**GLOSSITIS, CHRONIC STREPTOCOCCAL (Persistently Painful Tongue).***Herbert French, M.D., F.R.C.P.*

Various conditions may cause painful tongue; it is not the purpose of the present article to discuss transient states such as the effects of injury by biting or scalding, abrasions by a jagged tooth or ill-fitting toothplate, ranula, peptic ulceration, gross persistent lesions such as epithelioma, tuberculous ulceration, or syphilitic affections; but rather to draw fresh attention to a state of affairs in which the patient complains of acute distress from recurrent or persistent pain in the tongue, baffling the physician in his efforts to afford relief, yet associated with no definite ulceration and sometimes with so little visual evidence of any lesion at all that a diagnosis of 'neuralgia of the tongue' has been made in many of the cases.

The condition is doubtless allied to, or even identical with, that which Sir William Hunter describes in pernicious anæmia; but it would be wrong to suppose that the co-existence of pernicious anæmia is essential. The condition is not uncommon when the patient's blood-state is normal, and pernicious anæmia does not necessarily ensue even when the patient has been watched for years. Moreover, although pernicious anæmia cases may acknowledge that the tongue has sometimes been sore, if they are questioned closely, they seldom volunteer the statement that soreness or pain in the tongue has been a real trouble to them. The kind of patient of whom one is writing consults one about the tongue, and about the tongue alone.

To begin with, all they have noticed has been a little discomfort, generally about the tip, or along the sides near the tip; attributed perhaps to having sipped some tea or drunk some soup that was unduly hot; but the soreness has not subsided—rather has it spread to a larger area of the dorsum and sides, until the whole tongue may be sore. In a bad case the patient may find it difficult to eat on account of generalized tongue-pain; and some things cannot be taken at all because of the increased pain they give—vinegar, salt, sauces, spiced and hot things. Taste becomes abnormal, relish for food goes; in severe cases there may be acute dread of having to eat at all. The pain, discomfort, and 'nasty taste in the mouth' are present all the time; life becomes a misery; doctor after doctor is consulted in an endeavour to achieve a cure; none can see much wrong with the tongue; the patient does not get the sympathy deserved; neurosis becomes the label; and the sufferer may give up all doctoring as hopeless, bearing acute misery with what fortitude he or she may.

These cases are not neuroses, but are examples of persistent superficial glossitis, from which *Streptococcus pyogenes* is recoverable in nearly every instance. One cannot emphasize too strongly the organic nature of the trouble; it is unjust to speak of neuralgia and neurosis simply because one sees so little the matter. One may illustrate the severity of the condition by narrating the history of a case in which the suffering led to suicide in desperation. The patient was a perfectly sensible lady, the mother of a family. She had had the painful tongue for several years; had tried all manner of local treatment without success; had seen many general practitioners and consultants, but without relief; she had been labelled 'neuralgia of the tongue', but had no peace from the pain and discomfort in it except when, with difficulty, she got off to sleep; she could eat but the plainest of food, always cold, for heat to the tongue was unbearable; as a last resort it had been suggested that her two lingual nerves should be divided. The dangers that might ensue from so drastic a procedure were emphasized, but she was willing to go to any length to get relief, and welcomed the chance the operation seemed to give her. Whilst she was in the nursing home the surgeon put off the operation several times in the hope that the patient would decide against it; but the pain in her tongue was driving her so frantic night and day that she simply could not put up with it; and though perfectly sane in the ordinary sense, she went literally mad with pain and threw herself out of the window.

This is of course a very extreme case; but lesser degrees of the affection are far from uncommon. Some patients fear that the pain means cancer, and can be persuaded only with the greatest difficulty that they have not some grave disease of this nature.

Everyone knows the frantic discomforts of pruritus ani: the latter is often due to irritation of the peri-anal nerve-endings by mild streptococcal infection just beneath the skin. This state of painful tongue seems to be due to corres-

PLATE XXVII.

STREPTOCOCCAL GLOSSITIS

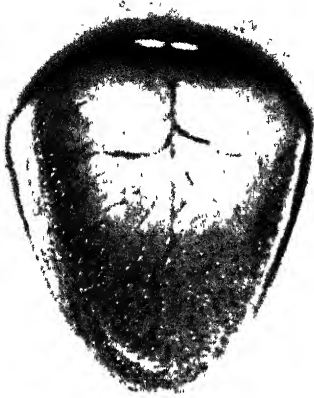


Fig. A

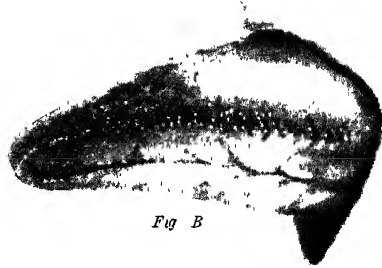


Fig B

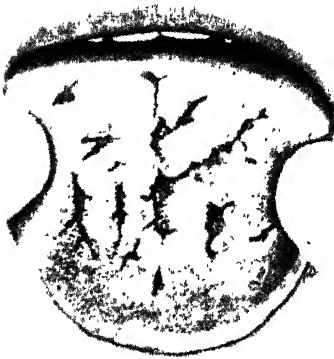


Fig. C

Herbert French

PLATE XXVIII.

STREPTOCOCCAL GLOSSITIS



Fig. A



Fig. B



Fig. C

Herbert French

ponding streptococcal infection just beneath the epithelium of the tongue—streptococcal superficial glossitis: the tongue cannot itch, but produces soreness, pain, and abnormal taste sensations instead. There is little to be seen to account for pruritus ani; there may be just as little to be seen to account for these painful tongues. The two are analogous: there are all degrees of both; both may subside spontaneously; both may get well for a time, to recur at varying intervals; both may persist and defeat cure; both may drive the patient nearly or quite mad.

Although as a rule there is little to be seen, so that the correctness of the diagnosis may be in question even if pathogenic streptococci are recovered in virtually pure culture from the tongue surface after previous washing and drying of the area from which cultures are to be made, there may sometimes be distinctive changes, though they may not attract notice at a superficial glance. *Plate XXVII, A, B*, presents these in a degree which has been a little exaggerated for purposes of illustration; they were taken from a patient who had suffered for over a year and was in the second week of an exacerbation. One must emphasize the fact that so marked a reddening is seen but seldom; and yet, in lesser degree, some extent of this type of colour change may generally be made out if it is looked for carefully in a good light. To a superficial inspection the tongue may look clean and ordinarily red; but at the edge, or along the sides or on the dorsum, part of the reddening is a little angrier than the rest—as if the tongue had a local area of erysipelas. This does not come and go rapidly—it is not a merely transient hyperæmia—but it may be seen day after day in the same region; tending to travel slowly backwards from the tip or sides until, after days or weeks, it may be present at the back of the dorsum, the front and tip of the tongue having recovered its normal colour; then after an interval a new patch may be apparent, spreading slowly as the days go by. Often, however, it affects the whole glossal mucosa, more or less, in the course of each exacerbation. There is no ulceration and no superficial exudate; the appearances could be compared, perhaps, with the sort of thing one would expect if the tongue developed a very chronic form of erysipelas, the latter running a course of weeks or months instead of days. In many cases there is no more than this; but after months or years the subepithelial layers of the tongue become affected, and multiple tiny fissures develop on the surface, often not obvious until the surface of the tongue is stretched by a finger on either side of it (*Plate XXVII, C*). The cracks that are thus opened up are generally much finer and more numerous than those here depicted—the drawing was from an advanced case. The fissures do not look in the least like syphilitic glossitis; in the cases here referred to there has been no question of syphilis, and the Wassermann reaction has always been tested and found negative. The fissures are in any case a late stage, but they add greatly to the pain the patient gets on taking vinegar or other acids, or on trying to drink hot things like tea.

Doubtless there are many types of things to be seen if one watches the patients closely enough; in one case, for example, whereas at most times there was little or nothing to be seen wrong with the tongue, on two or three other occasions there was a slowly spreading exudative glossitis, free from ulceration, but with a whitish granular exudate over the reddened 'erysipelas' patches—the latter healing in the parts affected first, as spread took place slowly to adjacent areas. *Plate XXVIII* depicts the changes that took place in the course of four weeks in this case, the tongue thereafter returning to an almost normal appearance for the time being, though always persistently so painful that the patient's life was a misery, and so far no one has succeeded in curing her.

TREATMENT.—What, then, of the treatment? Simple and complex mouth washes, local paintings with picric acid solutions, chromic acid, silver nitrate, albugin, collargol, and the like, all seem to fail; antimonial pastes, salvarsan solutions used locally or by injection, radical treatment of any infected foci in connection with the teeth, even removal of all the teeth, do not succeed, at any rate in cases in which the malady has acquired a thorough hold. It would seem that the chief hope lies in early recognition so that really adequate treatment can be adopted before the disease is well established. A big factor in the difficulty is that the streptococci, it would seem, are not on the surface, but just beneath the surface of the epithelium, so that they are not easily get-at-able. Dr. Goss, of Gloucester, advocates special preparation of the tongue before the antiseptic mouth-wash is employed; he gets his patient to learn how to protrude the tongue as far as possible, and then mop it thoroughly dry with a clean handkerchief; then to take a mouthful of Chlorine Water, diluted just sufficiently for it to be bearable, rinsing the tongue round and round in this for ten minutes before the antiseptic is expelled; this process being repeated night and morning and also after each meal. Dr. Curtis Webb, of Cheltenham, claims success from local Ionization of the tongue with a zinc salt, a special application being made to fit the tongue accurately. My own experience is that cure is extremely difficult to attain when once the condition has reached the stage at which I see it, although I do feel that the use of Antistreptococcal Serum locally in the mouth and a long course of Autogenous Streptococcal Vaccine Therapy has been helpful sometimes. The main thing is to be familiar with the condition, to diagnose it early, and to recognize that it is really an organic malady and not a neurosis nor a neuralgia glossæ.

GOITRE. (*See* THYROID GLAND, SURGERY OF.)

GNORRHŒA. (*See also* ELECTROTHERAPEUTICS.)

Col. L. W. Harrison, D.S.O.

Gonorrhœa in Women.—Von Rohden¹ reports the results of treatment of 135 women suffering from gonorrhœa with Intravenous Injections, but without local treatment. In a preface to the article, C. J. Gauss describes the tests by which the results were judged, and mentions that this investigation has not been obscured by the factor of local treatment. After completion of the programme of injections, usually about eight, a microscopical specimen of the secretion of the urethra and of the cervical canal was taken twice weekly until ten had been taken from each canal. If numerous gonococci were found, the case was placed in Group I (uncured). If only a few gonococci, or cocci which were indistinguishable from gonococci, were found, the mucosa of each canal was stimulated by mechanical and chemical means, and ten further specimens were taken from each. If many gonococci were found after this provocative treatment, the result was placed in Group I. If only a few, or doubtful, gonococci were found in a few specimens, the result was recorded in Group II (doubtful cure). If no gonococci were found after provocative treatment, the classification was Group III (probable cure). If no gonococci were found in any of the specimens of the first series and none after provocation, the case was classified under Group IV (certain cure). The remedies employed in the different series of cases were:—

1. Collargol, commencing with a dose of 0·05 grm. and advancing to 0·1 grm. for the remaining injections except the two last, which were 0·15 grm. and 0·2 grm. The injections were given every second or third day to the number of eight or ten.

2. Silver Preparation No. 1478 (Merck). This was given intravenously,

and at the same time a copper preparation known as **Kuprosan** (Merck), which contains 4·3 per cent copper, was injected intramuscularly. The silver preparation was given every third day in a dose of 0·1 c.c., increased to 0·2 c.c., and the copper every sixth day in a dose of 0·12 c.c.

3. **Chrysolgan**, a preparation of gold, given intravenously in a dose of 0·2 grm. every third or fourth day to a total of eight injections and, during the same period, three intramuscular injections of mercury salicylate 0·03 grm.

4. **Gonargin**, a vaccine given every third or fourth day in doses of 5, 7, 10, 15, 15, 20, 20, and 20 million.

5. **Gonotropin**, a gonococcal vaccine given in doses of 5, 10, 15, 20, 25, 30, 40, 50, 60, 70, 80, 90, and 100 million every third or fourth day.

6. **Autogenous Vaccine**, which was given in much the same doses as the other vaccines.

Of all the preparations, the vaccines were, on the whole, better tolerated. Of the metals, collargol seems to have caused the greatest reactions in the form of fever and general malaise, though none was dangerous. Of the vaccines, gonargin seems to have been tolerated best, and, in fact, caused no great disturbance. The results appear to have been good, 36·3 per cent having been certainly cured and 26·7 per cent probably so, making a total of 63 per cent of 135 cases certainly or probably cured by intravenous injections without local treatment. On the whole, the best results were obtained with the vaccines, especially with gonargin, under which there were 53·8 per cent certainly and 19·2 per cent probably cured, out of 16 acute, 23 subacute, and 13 chronic cases.

Suction Treatment of Uterine Gonorrhœa.—It is well recognized that the local treatment of gonorrhœa in women leaves much to be desired. Since gonococci cannot be reached in the depths of the tissues, the rational procedure is to bring them to the surface, where they can be discharged or destroyed by simple means. It is to this end that the reviewer has directed his treatment for some years, with results which are acknowledged by those who have witnessed them to be far better than followed the more drastic lines of treatment which preceded it. At the same time it must be acknowledged that the cure of gonorrhœa in women is still a lengthy business, and any method which promises to drag the infecting organisms to the surface at a greater rate is deserving of attention.

Many workers have aimed to solve this problem by the use of suction apparatus of various patterns, but with only limited success. Matzenauer and Weitgasser² review the various apparatus devised by different workers from time to time and, after discussing their disadvantages, recommend a new pattern. Most of the appliances devised for exercising suction upon the cervix have been tubular specula, which the authors of this paper hold are painful when used for the length of time necessary to achieve the object in view and are, moreover, inconvenient in that the patient has to remain on the table throughout the time the suction is being applied. To overcome these disadvantages, they employ a Bier's suction glass such as they often use for furuncles. To the projection on which the suction ball is normally applied is melted a glass tube, and on this is fixed a strong rubber tube through which the suction is applied with a syringe or a rubber ball. (A set of suitable glasses of various sizes is made by the firm of Gustav Eger, Graz, Austria.) The cross-section of the glass varies from 2·5 to 4·5 cm. according to the size of the cervix under treatment. The base of the bell glass must be shaped into a well-rounded cone, and the walls must be straight—not bellied out, lest the cervix, which swells under the suction, become imprisoned. The authors use a 'record' syringe of 100-grm. capacity for the purposes of suction. The glass bell is introduced through a

speculum, and is of a size which will fit easily over the cervix. It is pressed firmly against the upper vaginal wall, and suction applied with the syringe. Under this the cervix is drawn into the bell, and the lips of the os become everted. The rubber tube connecting the syringe with the tube of the bell is clamped, and the syringe removed. The patient can then leave the table and remain in another room for a quarter, half, or one hour, according to the case. When she returns to the table the cervix is found well fixed in the glass, and of a blue-red colour in consequence of the congestion. The glass is easily removed by allowing air to enter. As a variation of this procedure, the authors sometimes allow ten minutes' suction and then remove the glass, empty the secretion, and reapply. After removal of the glass a tampon dusted with *Vulnodermol* or *Choleval* bolus is inserted. Sometimes the treatment is combined with applications to the cervical canal, such as painting or washing with tincture of Iodine, Jothional, and the like. The authors claim good results, though the treatment has often to be carried out over two or three menstrual periods. In no case did the infection ascend to the higher parts of the uterus, though the authors made no use of atropine to stop antiperistalsis.

Cumberbatch and Robinson³ have obtained promising results by the use of Diathermy, particularly in gonorrhœa of the female urethra and cervix. They use a bougie electrode, and treat first the urethra. As this is sensitive to heat, the current which it will tolerate is a good guide to the amount which should be used in the cervix, which is insensitive and liable to suffer burns. The authors report on 16 patients on whom other methods of treatment had been tried without success. In 14 cases gonococci were present, but after an average of four applications could not be found in any of the cases except one in a period of observation which varied from two months to one year. In 3 cases a slight discharge persisted, and this was cured by Ionization with zinc or copper. In 6 cases the persisting discharge diminished, and the authors discuss with great fairness whether these cases in which no gonococci could be found on repeated examination can be claimed as cures. Milner and MacLachlan⁴ claim good results for diathermy in gonorrhœa of women. For the cervix they employed a cylindrical electrode $\frac{3}{4}$ in. long and $\frac{1}{4}$ in. in diameter, with a rounded end. The patient is put in the lithotomy position, and the indifferent electrode, which is a thick pad soaked in hot saline solution and measuring 20 by 10 cm., is applied to the abdomen as near to the pubes as possible. The electrode on its holder is passed into the cervix through a speculum, and a circular disc of the largest size which will pass comfortably through the speculum is pressed against the cervix. Before turning on the current the speculum is withdrawn slightly so as to avoid contact with the active electrode, but the wall of the vagina must not be allowed to overlap the parts under treatment. As a general rule from $\frac{3}{4}$ to 1 ampère is necessary, the object being to maintain a temperature of 107° F. The authors recommend that the intra-uterine temperature be taken with a rapidly-acting thermometer about every five minutes—rapidly-acting, because the normal temperature is restored very quickly after shutting off the current. The heat is maintained for ten minutes at each sitting. For treatment of the urethra, unlike the practice of Cumberbatch and Robinson, the electrode is not introduced into the urethra but pressed against the anterior vaginal wall under the urethra, the indifferent electrode being pulled well down over the pubes. The active electrode is a cylindrical metal rod $\frac{5}{8}$ in. in diameter and of convenient length. It is introduced two inches into the vagina and pressed upwards against the vestibule and urethra. The current required is rather greater than for the cervix—about 1½ ampères—and is applied for ten minutes. All the burning seen has been a very superficial coagulation, which has caused no difficulty in healing.

Vulvovaginitis in Girls.—It is well known that vulvovaginitis of children is a very intractable disease, and it is not uncommon to see cases which have been under treatment for many months still discharging pus containing gonococci. The usual treatment is to irrigate the vagina thoroughly, and perhaps to insert a small pessary or tampon containing one of the organic silver compounds. Some careful observers declare that the secret of success in the treatment of this troublesome complaint is in the thoroughness of the irrigation, and it is easy to believe this, since it seems probable that in most cases the disease is confined to the vulva and vagina, in the recesses of which the gonococcus may find a safe refuge from any irrigating solution. Harrison⁵ describes a new treatment which has so far given very promising results. Its principle is to paint the vagina thoroughly, as verified by actual inspection, with a **Strong Antiseptic**. Harrison's urethroscope, fitted with the largest cannula which will pass the hymen (size 28, 30, 32, or 34 French) is passed into the vagina as far as it will go. After removal of the introducer and mopping with a swab on a urethroscope cane, the lamp and eyepiece are fitted into the vaginoscope, and the vagina is inflated as in urethroscopy. After inspection, the eyepiece is removed, and the whole of the upper portion of the vagina is painted with 25 per cent Mercurochrome, 220. This can be done through the open end of the vaginoscope, or with the operating attachment. In either case the painting is continued until it is seen that every portion of the upper reaches of the vagina has been covered with the crimson-coloured antiseptic. It is possible with the operating attachment, using a dressed probe, to treat also the cervical canal. [Since the article was published, the results obtained in the centre at St. Thomas's Hospital by this method of treatment have continued to be highly satisfactory. In many cases no gonococci have been found after the first application, and patients who had been under treatment by the older methods for months have been discharged very quickly after institution of the new treatment.—L. W. H.]

Gonorrhœa in Men.—Kidd⁶ describes a modification of Belfield's operation from which he claims excellent results in *gonococcal arthritis*. The vas deferens on the side of the diseased vesicle is exposed just above the cremasteric fibres. After isolation it is brought to the surface, and the skin and subcutaneous tissues are fixed under it with a mattress suture. A special cannula which will fit the lumen of the vas comfortably is inserted in the direction of the urethra, and a little water injected to ascertain that it is correctly placed. After assurance on this point, 10 to 30 c.c. of a specially prepared collosol of silver (5 per cent) are injected until the vesicle is full. The silver solution passes down to the end of the ductus ejaculatorius and then regurgitates into the seminal vesicle. The operation is repeated three times in a week, and the mattress suture is then removed to allow the vas to be dropped back into its canal. The author describes cases which were restored to health almost at once after very long periods of crippling from rheumatism.

Cumberbatch and Robinson (loc. cit.) claim better results from **Diathermy** than from any other form of treatment of arthritis. At first the current was applied, in a transverse direction, only to the affected joint. Later it was found that better results are obtained when the original focus of infection is treated by the same method, and in some cases this (cervix or prostate) was the only part to which the current was applied. The applications were made for twenty minutes not less than twice weekly, but the authors think that better results would probably be obtained from longer and more frequent applications. In *gonococcal epididymitis* they state that they have obtained consistently better and more rapid results than in any other branch of the treatment. Pain and tenderness disappear after the first application, and after the third there are no signs of abnormality beyond slight thickening of the epididymis, without

pain or tenderness on pressure. The electrode applied to the scrotum is of sheet lead shaped specially to fit the scrotum closely on the affected side. The other electrode was at first applied to the hypogastrium, but later to the prostate or penis, in order to include the original site of the infection in the treatment.

REFERENCES.—¹*Munch. med. Woch.* 1922, Aug. 4, 1148; ²*Wien. klin. Woch.* 1922, Nov. 30, 937; ³*Brit. Med. Jour.* 1923, ii. 54; ⁴*Lancet*, 1923, ii, 652; ⁵*Ibid.* 336; ⁶*Ibid.* 213.

HÆMORRHAGE.

Sir W. I. de C. Wheeler, F.R.C.S.I.

Neuhof and Hirshfeld¹ recommend the intramuscular injection of Sodium Citrate for the control of bleeding. They base their conclusions on the fact that the anticoagulating action of sodium citrate in the employment of blood transfusion is followed by a coagulating effect in the case of the recipient's blood. The intravenous injection of solutions of sodium citrate in dogs has the following results: (1) The coagulation time is shortened within a few minutes of the introduction of non-toxic doses of sodium citrate; the shortened coagulation time may last for several days. (2) The bleeding time is also shortened; there is prompt coagulation about a wounded vessel. (3) Toxic or lethal doses of sodium citrate depend more upon the rate of introduction than upon the actual dose. The preparation recommended is a 30 per cent solution in distilled water, sterilized in an autoclave; 30 c.c. of this solution is the maximum dose for intramuscular use (about 20 c.c. for intravenous use in adults). The solution should not be used unless it is clear, and it should be introduced slowly. The intramuscular method is the one preferred, the clinical results proving as good as when the intravenous route was employed. The intramuscular injection into the gluteal region was painful, and it is recommended that a preliminary injection of 1 per cent novocain should be employed. It is an advantage to introduce 15 c.c. of the 30 per cent solution into each buttock. The use of sodium citrate in cases of hæmorrhage, or as a prophylactic in cases where operations are necessary, e.g., in jaundice patients, appears to be worthy of extended trial. The authors of this interesting paper arrive at the following conclusions:—

1. The administration of sodium citrate intramuscularly, intravenously, or subcutaneously, results in prompt and pronounced shortening of coagulation and bleeding time. This is a hitherto unrecognized pharmacological action of the drug.

2. The shortened coagulation time is of two to three hours' duration, with gradual return to the normal within twenty-four to forty-eight hours.

3. The sodium citrate curve occurs not only in individuals with normal coagulation and bleeding time, but also in those in whom there is pathological prolongation, notably in jaundice.

4. It does not occur in blood diseases characterized by blood-platelet deficiency—hæmophilia and purpura. These diseases appear to comprise the sole contra-indication to the use of sodium citrate for the control of bleeding.

5. The dose for intramuscular administration of sodium citrate is 9 grm. for adults. A 30 per cent solution is used, 15 c.c. into each buttock, preceded by novocain. The intramuscular method is free from danger, no untoward results having been noted in 200 cases, and is therefore the method of choice.

6. Internal as well as surgical bleeding, hæmorrhage not only in normal individuals but also in those with prolonged coagulation time, are decisively controlled by sodium citrate injections in the great majority of cases. These are cases of oozing surfaces or hæmorrhage from small vessels, for control of hæmorrhage from large vessels cannot be expected with the dosage of the drug at present employed.

7. The method offers also a large sphere of usefulness as a prophylactic measure against oozing at operation, especially in cases in which much bleeding is anticipated.

Schreiber² relates that, in his twenty-five years of practice, Aluminium Acetate has never failed to arrest hæmorrhage from inertia of the uterus at childbirth, and has proved its usefulness in many cases of parenchymatous hæmorrhage of various organs. He uses it in a 2 or 3 per cent solution to arrest obstetric hæmorrhages, diluting the official 10 per cent solution, which keeps indefinitely. The hæmorrhage after tonsillectomy was always arrested at once by rinsing out the nasopharynx with the 10 per cent solution.

REFERENCES.—¹*Ann. of Surg.* 1922, July, 1; ²*Schweiz. med. Woch.* 1922, May 11, 458.

HÆMORRHAGES IN THE NEW-BORN. (See NEW-BORN.)

HAIR GROWTH.

E. Graham Little, M.D., F.R.C.P.

Trotter¹ attempts to vanquish some superstitions about the growth of hair.

Vaseline, so largely used in so-called hair tonics, was experimented with in this way: Three women between the ages of 22 and 26 applied vaseline to the front of the right thigh twice a week for a period of eight months, the left thigh being untreated. No difference in growth of hair was noted at the end of this period in the two thighs. In a fourth case vaseline was applied to the right eyebrow twice a week for four months. No difference in growth between the two eyebrows was noted.

Exposure to sunlight is popularly supposed to be 'good for the hair'. Twelve women between the ages of 18 and 25 were treated as follows: An area on the back and more exposed portion of the right forearm, half-way between the elbow and wrist, was chosen, and samples of hair were removed from the spot. Five months later, after each of these subjects had exposed the forearm to sunlight for that period in a warm climate, similar samples were taken from the corresponding area on the left forearm. The earlier samples from the right forearm were then compared with those from the left, and no difference whatever in length, diameter, or pigmentation could be made out.

Shaving is supposed to increase the thickness and stiffness of hair. Three women shaved the right leg from the knee to the ankle twice a week for eight months. The hair was then allowed to grow for four months. No difference could be detected between the hair of the right leg and of the left, which had not been shaved.

REFERENCE.—¹*Arch. of Dermatol. and Syph.* 1923, Jan., 93.

HEADACHE, NERVOUS. (See NERVOUS HEADACHE.)

HEART BLOCK.

Drs. C. Lian and Ch. Petit.

(Translated by Currey F. Coombs, M.D., F.R.C.P.)

DIAGNOSIS.—Among the data furnished by electrocardiography some of the most interesting are those relating to block of one of the two main branches into which the bundle of His bifurcates, a condition which yields no signs apart from electrocardiography. The characteristic changes are: (1) The QRS group (representing the initial stages of the ventricular complex) is ill-defined, splintered, and so prolonged as to constitute more than one-third of the total duration of the ventricular complex QRST. (2) The T wave is in a direction opposite to that of the principal wave to QRS. When the fault of conductivity lies in the right branch, the QRS group also shows the changes characteristic of left ventricular preponderance (predominance of R

in Lead 1 and of S in Lead 3). These conditions are reversed when the lesion is in the left branch. These facts have been verified by experiment,¹ yet even in experimental, as in clinical cases, a mistake may be made in diagnosis as to which branch is at fault. Further, attempts have been made to recognize block of terminal branches ('arborization block'). The changes are similar

to those detailed above, but QRS has a very small elevation (Fig. 49). Finally, when branch block co-exists with coronary thrombosis,² the space R-T or S-T is often convex upwards, instead of being rectilinear (Fig. 50.)

Bundle branch block is not rare; it is met with in cardiac sclerosis, in cardiac rheumatism and cardiac syphilis, and as a transient phenomenon under the influence of large doses of digitalis. Its frequency is proved by the statistics of White and Viko,³ who, in electrocardiograms of 3219 patients, found 80 examples of arborization block, 41 of branch block. In the same group they found 129 cases of partial auriculo-ventricular block, 27 of complete block, 11 of sinu-auricular block.

PROGNOSIS.—From the table furnished by White and Viko it would appear that the prognosis of branch block is even worse than that of *a-v* block, the mortality of arborization block working out at 70 per cent, that of branch block at 60 per cent, that of partial *a-v* block also at 60 per cent, and that of total *a-v* block at 50 per cent.

Bearing on these observations the statistics of Willis¹ may also be quoted. They relate to mortality among cases showing either T negativity (except when it is in Lead 3 only, which has no significance) or alterations of QRS or both. There were 439 such patients examined between July, 1914, and January, 1920, and the results have been checked by a comparison with cases similar in all respects except for these particular electrocardiographic changes.

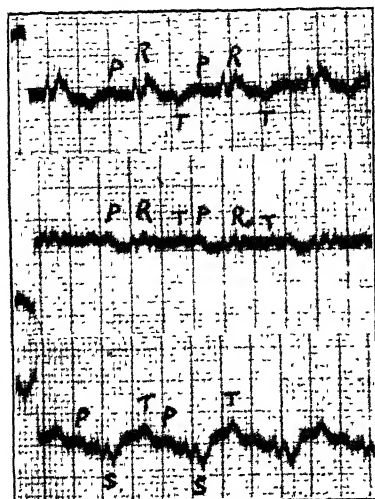


Fig. 49.—Electrocardiogram. These ventricular waves are considered to indicate 'arborization block' by the small amplitude and wide-notched QRS group, with the T waves opposite in each lead to the chief deflection of QRS. The step-like movement appearing at the end of each lead is due to the application of 1 millivolt. (Re-made from 'Jour. Amer. Med. Assoc.')

Electrocardiographic Change	Mortality Percentage	Mortality Percentage in the Control Series
T negative in Lead 1 ..	63.4	36.8
" " " 1, 2 ..	65.3	17.5
" " " 2, 3 ..	32.2	20.0
" " " 1, 2, 3 ..	62.5	20.5
QRS altered in all leads ..	62.9	21.5
QRS altered in all leads and T negative in Lead 1 ..	86.3	30.0
" " " 1, 2 ..	95.0	18.7
" " " 2, 3 ..	73.3	26.6
" " " 1, 2, 3 ..	100.0	0

Not only so, but, among those who have survived, the percentage displaying improvement is sensibly higher among control cases than among those showing the electrocardiographic changes.

TREATMENT.—The syncopal attacks that are characteristic of Stokes-Adams syndrome are sometimes so frequently repeated as to constitute a 'status'

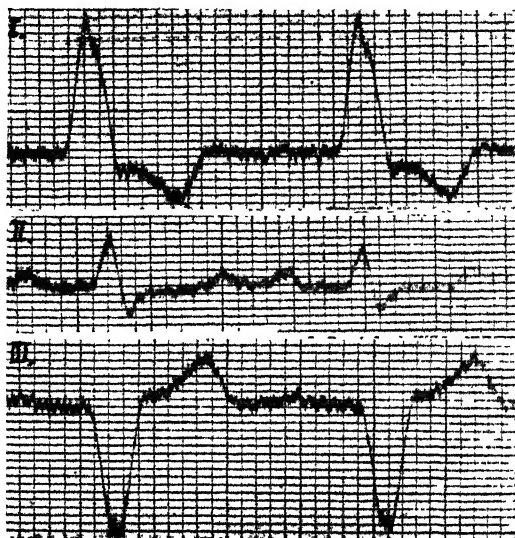


Fig. 50.—Block of the right main branch of the *a-r* bundle. The initial portion, Q R S, of the ventricular complex is lengthened, and notched on the down-stroke. T is in a direction opposite to that of Q R S. R predominates greatly in Lead I, S in Lead III—signs of left ventricular preponderance. (Re-made from article by Herrick and Smith, in *Amer. Jour. Med. Sci.*, 1922, II, 471.)

which may end fatally. In some such cases **Atropine Sulphate** 1 to 2 mgrm. injected subcutaneously may be of service,⁵ but sometimes it is without effect. It is therefore worth noting that **Adrenalin** has, in numerous observations,⁶ led to a termination of this status. Usually this is due to abolition of *a-v* dissociation, or merely to acceleration of auricles and ventricles, while sometimes attacks have disappeared without any alteration in the auriculo-ventricular rhythm. From the published facts it would appear that the best plan is to inject into muscle or under the skin $\frac{1}{2}$ mgrm. of adrenalin hydrochloride. One such injection may bring the syncopal condition to an end; but if necessary it may be repeated several times in the twenty-four hours, and for several consecutive days. The intravenous route is not to be recommended, for there have been accidents.⁷ In some cases this treatment fails, and one case of block⁸ was worse after its use. Such incidents as one might have feared from the fact that Stokes-Adams patients are usually hyperpnetics, have not been noted, and, in view of the grave prognosis of the condition, need not be taken into account.

REFERENCES.—¹*Arch. of Internal Med.* 1921, Oct.; and *Jour. Amer. Med. Assoc.* 1923, Jan.; ²*Boston Med. and Surg. Jour.* 1923, Nov.; *Amer. Jour. Med. Sci.* 1922, Oct.; and *Arch. of Internal Med.* 1922, Aug.; ³*Amer. Jour. Med. Sci.* 1923, May; ⁴*Arch. of Internal Med.* 1922, Oct.; ⁵*Bull. Soc. méd. Hôp. de Lyon*, 1922, Sept. 26; ⁶*Jour. Amer. Med. Assoc.* 1923, Jan. 5 (bibliography); ⁷*Jour. de Physiol. et Pathol. Gén.* 1917-18, 17, and *Arch. d. Mal. du Cœur*, 1920, Aug.; ⁸*Jour. Amer. Med. Assoc.* 1922, Nov. 4.

HEART DISEASE. (*See* ANGINA PECTORIS; DIGITALIS; DYSPNEA; ENDOCARDITIS LENTA; HEART BLOCK; INTRACARDIAC INJECTIONS; MYOCARDIAL INSUFFICIENCY; QUINIDINE.)

HEART DISEASE IN PREGNANCY. (*See* PREGNANCY, DISORDERS OF.)

HEART FAILURE AS AN ACCIDENT. (*See* MEDICO-LEGAL POINTS.)

HERNIA.

E. Wyllys Andrews, M.D., F.A.C.S.

Inguinal Hernia.—

Hernia in Children.—Bryan,¹ discussing this subject, says that when hernia is present in early infancy, surgery is not indicated until prolonged attempts at cure with trusses have proved futile. Usually a wool-skein truss is sufficient; but, if necessary, spring trusses are resorted to. It is important to have several trusses at hand always, so that there may not be even a moment in which the hernia is permitted to protrude. As to the operation needed to cure such hernias, he believes that in the majority of cases simple excision of the sac suffices. The hole in the cord should be closed, but no surgery of the inguinal canal is necessary. Rarely is there a gap in the abdominal wall greater than normal, and insertion of sutures in the structures about the canal does more harm than good.

Operative Technique.—Hofmann² reflects the views of a considerable number of surgeons lately that we are doing too much in some of our herniotomies and not enough in others. In incipient cases peritoneal closure is the all-important point. That includes not only resection of the sac as such, but also the closure of the peritoneal membranes flush with the abdominal wall.

On the other hand, there are many cases in which the routine Bassini operation is not sufficient. Where the canal has been stretched, approximation of the conjoined tendon to the inner edge of Poupart's ligament can only be brought about by extreme tension. In these cases it is the ligament that gives away, leaving a defect very difficult to close. To avoid this disastrous accident O'Connor³ has devised a method of carrying his sutures so deep that they include a bite of Cooper's ligament as well. This not only takes some of the strain off Poupart's, but also anchors the conjoined tendon much more firmly and more deeply than would be possible by any other means. Wise⁴ accomplishes the same thing in a little different way. He puts a loop of his thread through some of the pectineus fascia, and thus when the stitch is tied the tension on Poupart's is less but the closure is more complete, as the conjoined tendon is pulled in a downward direction, perhaps a little more in the correct line than by the method of O'Connor, although the tissue to which it is anchored is not so strong.

End-results of Operation.—Erdman⁵ presents an excellent statistical review of the results of 978 cases of herniotomy, all of which were traced and re-examined. Of 665 operations for simple oblique hernia, 21 recurred, or 3.15 per cent. Of direct hernias, 313 in number, 52, or 16.61 per cent, recurred. These findings are in close accord with other such follow-up reports published in recent years. The recurrence-rate in the oblique forms, however, is a little less than that of other reports. In the very aged the recurrence-rate was much higher. In patients over 60 years old, 10 per cent of oblique and 42.8 per cent of direct hernias recurred. Of the 938 individuals operated upon, but 3 died, one each from pneumonia, pulmonary embolism, and erysipelas. Comparison of the results of different types of operations showed clearly that it is a mistake to close the conjoined tendon over the cord. This is especially true of direct hernias, where this operation yielded a far higher recurrence-rate. In the oblique type the recurrences were only slightly higher.

Use of Non-absorbable Sutures.—Although the employment of non-absorbable suture material probably has no place in the surgery of ordinary hernias, it is still used to a considerable extent in certain unusually large ones. Souttar⁶ reports two cases in which he 'darned' across large hernial rings with coarse silk floss. Both of these cases were of the type in which it is absolutely impossible to approximate the edges of the rings. In each case normal wound healing took place and the scar was a firm dense one with no yielding. Moure⁷ describes a method in which a bronze wire is placed about the neck of the opening, being buried as a purse-string. This is slowly tightened until the edges are brought tightly together.

Femoral Hernia.—

Saccular Theory of Hernia.—Hamilton Russell⁸ has always been one of the leading advocates of the saccular or congenital theory of hernia. He believes that this applies to femoral as well as inguinal hernias, and gives an able review of the evidence for this theory. Acting on this assumption, he says that all that is needed to cure these hernias is the removal of the sac, and that except in special cases any further procedure is worse than useless. Particularly he condemns the more modern practice of operating through the inguinal canal. He believes that the best procedure is the simplest. The sac is exposed and opened. The interior is searched for adherent viscera, which are loosened and reduced. Then the sac is seized in a forceps and twisted gently as the best way of freeing it from the adjacent tissues. The practice of extensive dissection in the femoral canal, in order to assure a high ligation of the sac, is condemned. A ligature is placed as high as is convenient, the twisting and not the ligature being relied upon to close the neck of the sac. During convalescence a slight pressure is maintained over the femoral region by means of an elastic bandage.

REFERENCES.—¹*Lancet*, 1923, March 17; ²*Zentralb. f. Chir.* 1922, July 1; ³*Med. Press*, 1923, June 6; ⁴*Surg. Gynecol. and Obst.* 1922, July; ⁵*Ann. of Surg.* 1923, Feb.; ⁶*Brit. Med. Jour.* 1922, Nov. 25; ⁷*Jour. de Chir.* 1922, Nov.; ⁸*Brit. Jour. Surg.* 1923, July.

HERPES ZOSTER.

E. Graham Little, M.D., F.R.C.P.

Comby¹ has collected 84 cases of herpes zoster in children from eight months to fifteen years old. In none of these was there any connection with varicella, and he protests against the assimilation of the two diseases. The eruption was bilateral in two cases. Of 25 cases tested with tuberculin, 18 gave a positive result. The question of connection with varicella was debated in the discussion which followed the paper. It was pointed out that there were several instances of herpes zoster and varicella occurring in the same subject with a few years' interval, a fact which militates against their being the same disease. Pignot and Durand at the same meeting reported a case of a woman who had herpes zoster, and whose nursing, nine months old, developed varicella thirteen days after. Netter brought forward nine new cases of the coincidence of the two diseases, and he maintains the view that varicella develops in connection with herpes zoster in persons who have not had a previous attack of varicella.

Howard Fox² recommends the use of occlusive dressings as a means to relieve pain, and thus describes the procedure. The caution is given that the method is of value only in the eruptive stage, and is useless for post-herpetic neuralgias. The technique of treatment consisted simply of spraying melted Paraffin with an atomizer on all the cutaneous lesions, and covering such areas with a generous layer of absorbent cotton, held in place by bandages. For convenience, the atomizer was attached to a compressed-air outlet. In a few cases the paraffin was applied by cotton swabs, an equally efficient, although slower and less convenient, method. When fresh applications were made, the previous

layer of paraffin was gently removed. The form of paraffin used was parresine. This is described by the manufacturers as a "waxlike preparation consisting of paraffin so treated by the addition of gum elemi, Japan wax, and a purified asphalt as to modify its physical properties, especially as regards ductility, pliability, and adhesiveness". The preparation begins to melt at from 114° to 117°, and becomes completely liquid at 120°.

Generalized Herpes Zoster.—Parounagian and Goodman³ report a very interesting case of this rare condition, in a Scotchman, age 64. The eruption of well-developed herpes of a right abdominal segment was observed, and had begun about a week previously. In addition to the restricted segmental distribution there were numerous scattered vesicles on the flanks, thighs, shoulders, arms, and axillæ. The diffuse eruption closely resembled varicella, which was the diagnosis first offered. The authors append an extensive review of similar cases in the literature, which includes a number of cases reported as a combination of herpes and varicella. The authors suggest that these cases diagnosed as varicella were nothing but the aberrant eruption of herpes. [The present reviewer is strongly of their opinion.—E. G. L.] They conclude that there is a clinical group of cases best labelled as generalized herpes zoster, and that this is separate and distinct from the fortuitous association of herpes zoster and varicella. (*See also* CHICKEN-POX.)

REFERENCES.—¹*Jour. Amer. Med. Assoc.* 1922, Sept. 16, 1001; ²*Ibid.* Dec. 9, 1979; ³*Arch. of Dermatol. and Syph.* 1923, April, 439.

HICCUP.

Herbert French, M.D., F.R.C.P.

In the medical papers from time to time one sees requests from doctors for any drug which will relieve persistent hiccup. This condition is by no means uncommon, and often proves difficult to arrest: the following may prove useful.

Dr. Christmas¹ writes to say that he has found *Liquor Trinitrinæ* successful where other remedies have failed. He begins with $\frac{1}{2}$ -min. doses every hour for three hours; then 1 min., and then 2 min.

Charles L. Gibson² advocates the intramuscular injection of 25 to 30 min. of *Ether*. If the original dose is not successful, it is repeated once or more times at several hours' interval.

REFERENCES.—¹*Brit. Med. Jour.* 1923, i, 542; ²*Jour. Amer. Med. Assoc.* 1923, Feb. 10, 399

HIP, CONGENITAL DISLOCATION OF. *E. W. Hey Groves, M.S., F.R.C.S.*

Of very great value in deciding on the best method of treating cases of congenital dislocation of the hip are those reports of series of cases treated by various methods in regard to late results. One of the best of these in regard to fairness and accuracy is that of Fairbank,¹ who describes a consecutive series of 146 cases (175 hips) in which no less than 112 were examined at periods of five or more years after treatment. In all except 13 the treatment was only *Manipulative*, and therefore the chief value of this paper consists in its criterion of the prospects of such bloodless methods in the hands of an expert. The manipulation used was similar to that described by Lorenz, but conducted with less violence. The adductor muscles were stretched rather than ruptured; a sandbag behind the hip was used instead of a hard wedge. After reduction the hip was kept for six months in a right-angled position, but the knee was not included in the plaster.

The actual results after five years or more are given in the form of a number of tables, showing the influence of age and bilateral dislocation on the final condition. Apart from death (which only occurred once), five results are possible :—

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PLATE XXIX.
CONGENITAL DISLOCATION OF HIP



Fig. A.



Fig. B.



Fig. C.



Fig. D.

1. *First-class cure* (30 cases).—Here the joint is perfect anatomically, and in the very great majority function is normal. It occurs much more frequently in cases treated at or below 3 years than in older children. (*Plate XXIX, A.*)

2. *Second-class cure* (15 cases).—The head of the femur is secure in the acetabulum, but deformed in regard to the head or neck of the bone. Function is not so good as in the first class. (*Plate XXIX, B.*)

3. *Anterior reposition, Class 1* (13 cases).—In this the head of the femur slips upwards and forwards, but in this position maintains good stability and fair function. (*Plate XXIX, D.*)

4. *Anterior reposition, Class 2* (15 cases).—Here the position is as in the last group, but the head or neck of the femur is deformed. (*Plate XXIX, C.*)

5. *Failures* (39 cases).

DESCRIPTION OF PLATE XXIX.

Fig. A.—Boy, age 2 years at operation: bilateral congenital dislocation: radiogram taken 9 years after reduction, showing *Class 1* cure both sides. Coxa valga is present on both sides, but function is perfect.

Fig. B.—Boy, age 6½ years, congenital dislocation of left hip, with some coxa valga. Radiogram taken 10½ years after reduction, showing *Class 2* cure. Marked coxa valga. Function perfect.

Fig. C.—Girl: congenital dislocation of left hip, age 8 years at operation. Radiogram taken 13½ years after reduction of the dislocation. Result 'anterior reposition', *Class 2*. Gross changes in the head and neck of the femur, with flattening and condensation of bone in the region of the upper acetabular margin, the result of absorptive arthritis. Function good.

Fig. D.—Left hip 11½ years after reduction, showing 'anterior reposition', *Class 1*. This hip was not treated by open operation. Function fair.

Putting together the two groups of cures and the two groups of anterior reposition, we have the following percentage figures which show the results at various ages and in the case of unilateral and bilateral dislocation:—

Age	UNILATERAL		BILATERAL	
	Cures	Anterior Reposition	Cures	Anterior Reposition
Under 3 ..	70	15	47	33
3 to 6 ..	50	27	23	18
6 and over ..	28	33	33	25
All ages ..	46	25	32	24

The author strongly supports the view that the manipulative method should be used in all early cases, and that it should be applied before the age of 3 years. He regards 18 months as the best time for treatment to begin.

In regard to complications, in 5 cases the femur was fractured, in 1 the sciatic nerve was damaged, in 2 a hæmatoma was produced, and suppuration caused death in 1 case. Pseudo-coxalgia resulted in 7 cases, and some degree of arthritis in 6.

In regard to the treatment of old unreduced cases of dislocation of the hip, whether congenital or acquired, the value of *Subtrochanteric Osteotomy* has long been recognized, and Lorenz² re-directs attention to the value of this operation, giving a careful explanation of the nature of the disability it is designed to relieve and of the rationale of its action. In all cases of old

dislocation, the patient suffers from pain, weakness, and fatigue, in addition to the unsightly limping. The pain is due to the fact that the body-weight is transmitted from the pelvis to the femur by the mere suspension of soft parts

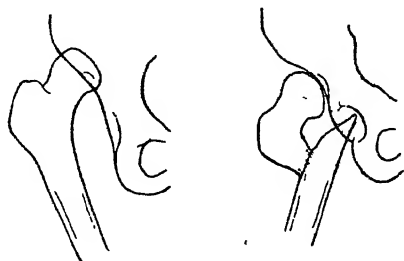


Fig. 51.—The left sketch represents an irreducible traumatic hip dislocation. The outlined X-ray picture on the right side shows the anatomical result of the bifurcation.

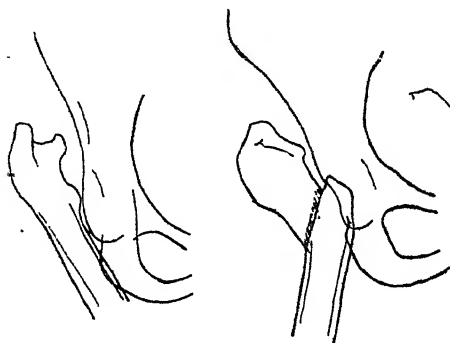


Fig. 52.—Shows at the left side the outlined X-ray picture of a pathological osteomyelitic luxation. The upper end of the femur, the head being destroyed, looks like a broomstick. The sketch on the right side shows the bifurcation.

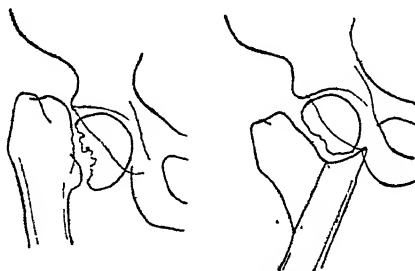


Fig. 53.—Shows, on the left side, a loose pseudarthrosis with marked dislocation upward of the great trochanter. The sketch on the right side shows the anatomical result of the bifurcation. In such cases the upper end of the lower fragment cannot be called a newly created head, because the normal head lies undisturbed in the socket; but it functions as a bony pillar propped against the lower rim of the socket, or, as it were, against the chin of the head. The pseudarthrosis is put out of commission. The head rests in the angle of the bifurcated femur.

(Figs. 51, 52, 53, Re-drawn from the 'New York Medical Journal'.)

which are both elastic and sensitive. The weakness and fatigue are caused by the lack of direct support of the pelvis by the femur. The femur lies tangential to the pelvis, and gets no proper purchase upon it. The lameness

is due to the fact that, when the patient stands on the affected side, the sound side of the pelvis drops until the ischium comes in contact with the shaft of the femur. All these symptoms, the pain, the weakness, and the special type of lameness, will be alleviated if the femur can be given a direct thrust upon the pelvis instead of merely sliding against its side.

The femur is divided by an oblique osteotomy from in front downwards and backwards and from side to side, at a point opposite to the level of the old acetabulum. When the bone has been completely divided, the distal end, i.e., the shaft, is abducted, and its extremity is pushed in towards the acetabulum. The limb is put up in plaster in full abduction. The patient is allowed to walk on the sound leg, with crutches, in plaster, after a few weeks, and at the end of three months he walks upon both legs. In the meantime the upper end of the femur has united into a sort of Y shape, and Lorenz gives to this operation the name of the 'bifurcation operation'. The adducted thigh is now abducted, the pelvis is tilted over on to the diseased side, and the weight of the body is transmitted to the leg directly, since the pelvis lies in the crutch at the upper end of the bifurcated femur (see Fig. 51). Ashley³ also writes in strong support of this method, and illustrates his paper by skiagrams of cases after treatment. Lorenz considers that this method of treatment is applicable to congenital dislocation of old standing, irreducible traumatic dislocations (Fig. 51), pathological dislocation (Fig. 52), severe cases of coxa vara, certain cases of ununited fractures of the neck of the femur (Fig. 53), and in exceptional cases of tuberculous arthritis or osteo-arthritis.

REFERENCES.—¹*Brit. Jour. Surg.* 1922, July, 24; ²*N. Y. Med. Jour.* 1923, Feb. 7, 130
³*Ibid* 136.

HODGKIN'S DISEASE.

Herbert French, M.D., F.R.C.P.

The late Sir James Galloway¹ drew attention to certain manifestations of this disease, and illustrated the points from cases which had recently come under his own observation. Amongst them he mentions:—

1. *The Occurrence of Unusual Protein in the Urine.*—This was in the case of a man in whom the post-mortem findings completely confirmed the diagnosis. First observed in 1919, in 1921 he complained of frequency of micturition during the night, although in the daytime this did not occur. On examining the urine, a faint cloud appeared on acidulating and heating, but on further heating this cloud disappeared. A heavy precipitate came down with picric acid saline, and in the Esbach tube amounted to 14 parts per 1000. The protein was investigated by Mr. Sydney Cole, of Charing Cross Hospital, and appears to be of a similar nature to Bence-Jones protein, in that it is coagulated on heating, disappears on further heating, and reappears on cooling; but whereas Bence-Jones protein coagulates at 55° and under, this protein does not coagulate under 75°, then only in the presence of a considerable amount of acid and salts like sodium chloride or ammonium sulphate. It becomes quite insoluble if kept at 80° for some minutes. It is not precipitated by HCl under any conditions.

2. *The Fever.*—In all cases the temperature is raised at some time. While in many cases the occurrence of fever seems to be irregular and comparatively mild in degree, in a few cases the course of the temperature is extraordinarily regular, both in its exaggerations and its relapses. Close examination of apparently irregular cases gives evidence of a definitely periodic course. Fig. 54 shows the chart during the five months preceding the death of a patient, and it demonstrates the periodic character extremely well. During the relapses of fever the patient was deeply unconscious, with low delirium, and resembled a severe case of typhoid fever about the third or fourth week. When the temperature remitted he recovered consciousness and improved in appearance.

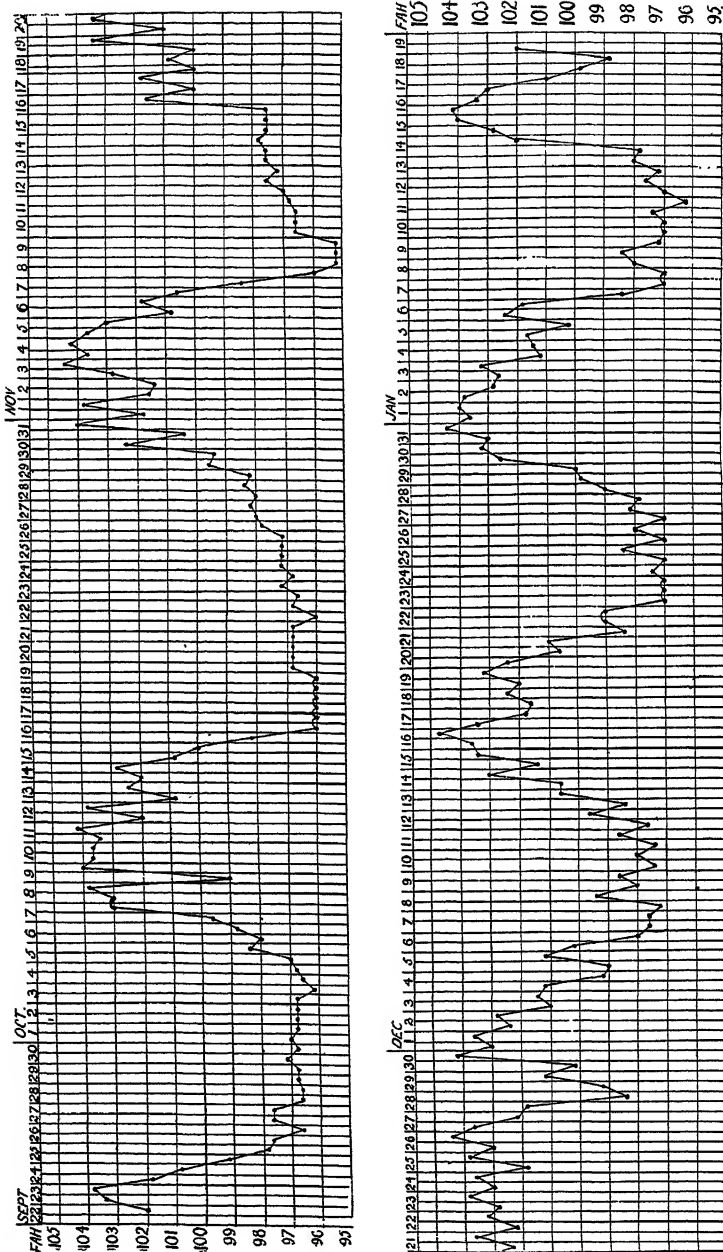


Fig. 54.—Temperature chart of a case of Hodgkin's disease. (Kindly lent by the 'British Medical Journal'.)

PLATE XXX.
X-RAY TREATMENT OF HODGKIN'S DISEASE
(SIR JAMES GALLOWAY)

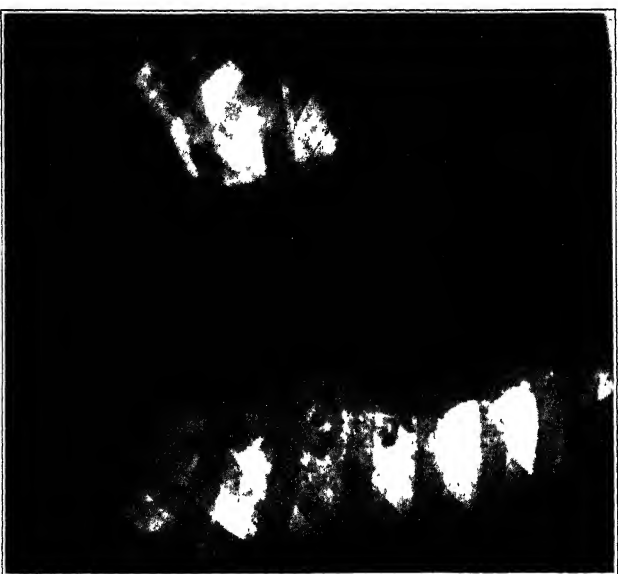


Fig. A.—Photograph of chest on Nov. 30, 1921, showing the masses in the mediastinum before treatment by X rays.
MEDICAL JOURNAL, 1922



Fig. B.—Photograph of chest, Jan. 11, 1922, showing diminution of the masses under X-ray treatment carried out since Nov. 30, 1921.
By kind permission of the 'British Medical Journal'

PLATE XXXI.

HYDROA ÆSTIVALE

(MACKAY AND GARROD)



By kind permission of the 'Quarterly Journal of Medicine

Study of the chart shows the relapsing type of the fever; there are febrile periods lasting from five to eleven days, followed by periods of pyrexia usually longer than the periods without fever. The cycle from one period of pyrexia to the end of the next appears to be on an average about twenty days. The character of the fever creates the strong impression that the disease is an infective poisoning, probably of a parasitic nature. As Sir James Galloway says, it is a facile suggestion to make, that the infective agent may be a protozoon, but unfortunately we have no definite evidence that a parasite is the cause of the disease.

3. *The Cutaneous Signs.*—

a. Small erythematous points or macules on the skin of the body and extremities. Sometimes they become papular, and they usually disappear, leaving a faint staining of the skin.

b. Prurigo in association with the enlargement of the lymphatic glands. Wide areas of the skin aggravated by friction and scratching may become thickened and swollen, producing an exaggeration of the natural texture of the skin and giving an elephantoid appearance. In appearance this condition closely corresponds with lymphodermia. Fine desquamation and pigmentation of a pale yellow-brown colour may occur.

c. Pruritus is the most important of the cutaneous symptoms. It occurs very commonly in a mild degree, but in those cases which develop the papular lesions the itching is intense, most exhausting, and nothing seems to be able to control the desire to scratch and rub the affected areas.

d. Small tumours and nodules in the skin. These occur much more rarely. They are often numerous, small in size, being not bigger than a broad bean at most, flattened, and pale pink or brownish in colour. Histologically they are the characteristic Hodgkin's granuloma. It is interesting to read that the tumours of mycosis fungoides closely resemble those of Hodgkin's in their histology, so much so that certain observers have come to the conclusion that mycosis fungoides is but a special manifestation of Hodgkin's disease affecting mainly the skin. It is also important to remember that the cutaneous manifestations in the varieties of leukaemia also resemble the conditions mentioned, both as regards the prurigo and the nodules.

4. *TREATMENT.*—This is unsatisfactory in the absence of knowledge of the cause. Arsenic still seems to be the only drug which has any beneficial result. Sodium cacodylate, in quarter-grain doses by the mouth until as much as a grain and a half is given in the day, is usually well borne by most patients. Arsenic, however, seems to increase the pruritus after a time, and this should be borne in mind, as stopping the drug will then sometimes diminish the pruritus. X Rays are certainly of value in lessening the size of the glands, especially those within the thorax, which give rise to discomfort, dyspnoea, stridor, and pain. One case is cited in which treatment with X rays two years before was followed by very satisfactory results. A year later, on recurrence of the symptoms, a second treatment produced relief, and the patient after two and a half years remains free of her symptoms and is able to carry out her duties. Plate XXX shows the diminution in the size of the mass in the mediastinum as the result of treatment with X rays. Care is needed in the X-ray treatment of these cases, as sometimes a resolution of the lymphoid masses appears to occur too rapidly under the X rays, with the result that very severe reactions with serious rise of temperature and other untoward manifestations may occur. Furthermore, the tumours of Hodgkin's disease do not always diminish under X-ray treatment. In some cases there is little or no result, and this may be due to fibrous changes in the glands having occurred.

REFERENCE.—¹*Brit. Med. Jour.*, 1922, ii, 1201,

HYDATID CYST. (*See* BLADDER, DISEASES OF.)

HYDATID DISEASE OF LUNG. (*See* LUNG.)

HYDROA ÆSTIVALE, WITH PORPHYRINURIA. (*See also* URTICARIA.)

E. Graham Little, M.D., F.R.C.P.

This association, first noted by McCall Anderson, is considered in detail in this paper by Mackey and Garrod,¹ who record a new and very remarkable case. Examples of this combination are extremely infrequent. Hydroa may exist without porphyrinuria, but recent evidence points to the possibility of porphyrin being present in the faeces without appearing in the urine, and hitherto little attention has been paid to this factor. Porphyrinuria may occur without hydroa, so that other photo-sensitizing agents may play a part in the production of hydroa. Porphyrinuria may be congenital or acquired. In the former group the authors consider that "a rare inborn error of metabolism" is to be assumed. Its rarity may be estimated by the statement that only fifteen authentic cases have been recorded, of whom ten were males, four females, and in one the sex was not stated. The two original cases, brothers in a family of seven children, first described by McCall Anderson, have been followed up by the authors, who state that both patients died under the age of 40, and there is evidence to indicate that the condition shortens life, although one patient lived to the age of 65. The non-congenital cases may be classified thus: acute toxic, due to the ingestion of a drug, such as sulphonal; acute non-toxic, in which no drug has been given; and chronic. Hydroa has been observed in association only with the chronic acquired and congenital cases. In several of the recorded chronic cases a pink discoloration of the bones has been demonstrated at autopsy. The absorption of porphyrin has been proved experimentally to render individuals sensitive to light, and porphyrin may be assumed to be the actual cause of the hydroa where the association exists.

The new case here recorded was the youngest child of a family of five; no other children showed the symptom, and the parents, in whom consanguinity could be excluded, knew of no other instances in their respective stocks. The patient, aged 6 at the time of observation, was reported to have passed red urine from the very first voidance. The earliest attack of a bullous eruption appeared at the age of three months, on his face and hands. At nine months the first tooth was cut, and it was pink in colour, as were all the subsequent teeth, the colour changing to a brown pink with the lapse of time. This constitutes the first observation of this coloration of the teeth. Porphyrin had been demonstrated in the urine from the age of two years, and at a later examination in the faeces also. No organic disease was noted, in particular no enlargement of the spleen, which has been a feature in some of the records, and the blood-count was normal. The skin eruption had recurred every spring and summer after the first attack, on the exposed parts, and had left much scarring, to such a degree in fact that Douglas Heath, who saw the case with the authors, makes the pertinent suggestion that the clinical features were more like those of epidermolysis bullosa than hydroa. The case is such an important one that Heath's description is appended:—

"The patient (*Plate XXXI*) is a rather thin and pale little boy, with very long black eyelashes and scanty hair. The skin of the whole body is of normal colour and texture, except where it has been exposed to light.

'On the uncovered parts of the body, i.e., the vertex of the scalp, the face, ears, and neck, the extensor surfaces of the knees, and the backs of the hands, the whole of the skin is covered by recent and old scars which give the skin a wrinkled and lined appearance. The scarring is everywhere of a mild, soft

type, and no cheloidal changes nor telangiectases can be seen. As might be expected, the more recently scarred areas are pink, or faintly red, in colour, and are more tense than the older ones. The eruption is, at present, most severe on the backs of the hands and fingers, so that the hands appear puffy and swollen as a whole, and independently of the local swelling due to the bullæ.

"The eruption itself consists of:—

"1. Bullæ, mainly from $\frac{1}{8}$ to $\frac{1}{4}$ in. diameter, with clear or faintly-red contents. These bullæ seem to have no regular arrangement and are thickly or sparsely scattered over the affected parts. The great majority seem to be surrounded by unaffected skin, and show no areolæ or redness. On the fingers and thumbs the bullæ are extremely tense, and raised $\frac{1}{4}$ in. or so above the surrounding skin. Large bullæ cover both thumbs, and the nail of the left thumb is raised from its bed. (The nails have been lost from time to time.) Similar but rather flatter bullæ are scattered freely over the face, neck, ears, knees (fronts and sides), and also on the vertex of the scalp.

"2. Purpura-like marks, from $\frac{1}{8}$ to $\frac{1}{4}$ in. diameter, and of a purple-red colour which does not fade on pressure. These are abundant on the sides of the face and cheeks. They can be seen to follow the line of a slight scratch on the left cheek, and seem to occur after very slight injuries.

"3. Excoriations, due to scratching, which very readily bleed. A very slight amount of friction seems to set up these sores. Several such excoriations can be seen on the vertex of the scalp and on the face.

"4. Conglomerated milium-like epidermic cysts of a white colour which are closely set on many of the pink areas left after the bullæ have dried up. These cysts are specially abundant upon the backs of the hands.

"Except for the fact that the eruption is confined entirely to the exposed surfaces of the body, and appears only in the summer months, it more closely resembles, in its clinical features, epidermolysis bullosa than hydroa æstivale. There appears to be in summer, in this patient, a vulnerability of the skin to slight injuries, but on the exposed surfaces only, a feature which is seen in a more widespread manner in epidermolysis bullosa. It appears that, when the skin has once been sensitized, external irritation, e.g., scratching, will keep up the eruption, as does further exposure to the sun."

Transillumination of the bones offered convincing evidence of pigmentation being present in them also, as well as in the teeth. Radiograms showed delayed ossification in the bones of the carpus.

Congenital porphyrinuria seems independent of diet, and the pigment is probably derived not solely from blood, so that the term hæmatoporphyrin is discarded. It would appear to be an intermediate product between blood pigment and bile pigment, and is present in the antenatal meconium.

REFERENCE.—*Quart. Jour. Med.*, 1922, July, 319.

HYPERTHYROIDISM. (See THYROID GLAND, SURGERY OF.)

HYSTERICAL PARALYSIS OF THE LOWER LIMB.

Sir James Purves-Stewart, K.C.M.G., C.B., F.R.C.P.

A valuable sign of organic as contrasted with hysterical hemiplegia is *Babinski's combined flexion of the hip and trunk*, a phenomenon almost invariably present in organic pyramidal lesions. To elicit this, the patient lies flat on his back on a smooth hard surface, such as a table or the floor, with his arms crossed in front of his chest and the legs not allowed to touch each other. We then ask him to sit up without using his arms. As he does so, the organically paralysed lower limb becomes flexed at the hip and its heel is raised from the

surface. Meanwhile the back of the non-paralysed heel is pressed against the floor, and the shoulder on the healthy side is carried forward, so as to counterpoise the contralateral lower limb. In hysterical hemiplegia this sign is absent; the hysterically paralysed lower limb remains unraised, and the backs of both heels remain firmly pressed on the floor, as in the normal individual.

Hoover,¹ of Cleveland, fifteen years ago described a somewhat similar sign for the detection of hysterical paralysis of the lower limb. He pointed out

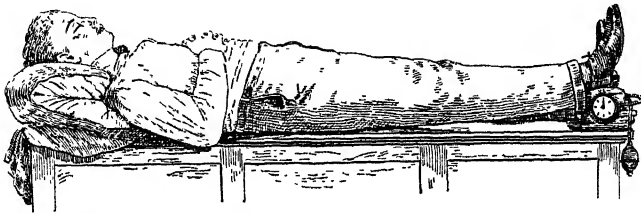


Fig. 55.—Position of patient with sphygmomanometer beneath the right heel. Extremity is elevated sufficiently to clear the leg muscles from contact with the horizontal surface.

that if a normal individual, lying on his back, raises one extended limb in the air, the back of the heel of the contralateral leg is pressed backwards on to the floor or table on which he is lying, so as to counterbalance the elevation of the one leg. If the patient has an organic hemiplegia, on attempting to raise the paralysed extended leg, the opposite unaffected heel makes counter-pressure backwards. If, however, the paralysis of the lower limb is hysterical, the

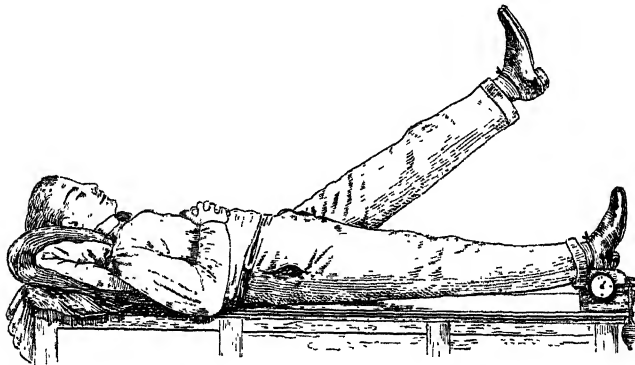


Fig. 56.—Manner of elevating the opposite extremity, with leg fully extended. The absence or presence of any complementary contralateral pressure can thus be determined and the amount visualized by means of the recording dial.

(Figs. 55 and 56 are reprinted from the 'Journal of the American Medical Association'.)

normal heel makes no counter-pressure against the couch on attempting to raise the hysterically paralysed extended leg, but remains limp on the couch. Hoover's sign has not been sufficiently made use of, probably because there is no obvious means at hand whereby the observer can accurately observe the backward pressure by the non-elevated heel.

To overcome this deficiency, Throckmorton,² of Des Moines, Iowa, has devised a simple method of recording the backward pressure exercised by the heels in

health and in conditions of paresis, whether organic or hysterical (*Figs. 55, 56*). The patient lies on his back as before, with the legs separated. Behind one heel the air-bag of an ordinary sphygmomanometer is placed, propped on a book or some other firm object, so as to raise the back of the calf from the table and rest the entire weight of the heel on the air-bag. This is now inflated until its surfaces are well separated, thereby ensuring that the heel will always be resting on an air-cushion. The average pressure of air in adults is about 30 mm. of mercury, as indicated on the recording dial of the sphygmomanometer. Now, with the heel resting on the air-cushion, the leg entirely free from contact with the table, and the starting-point on the dial observed, the patient is instructed to raise the opposite extended lower limb to an angle of about 45° . The maximum excursion of the recording pointer is then noted, and particularly the reading at which the backward pressure of the heel is sustained. It is usually well to repeat the test once or twice, to make sure that the readings show no great variation.

After the reading has been taken on one side, the air-cushion is placed beneath the opposite heel. Here, for several reasons, the starting-point may be found different from the one used for the first set of readings. If too low, more air is introduced; if too high, the release valve is opened until we obtain a starting-point similar to that of the other side. In normal individuals with no paralysis of either limb, the readings on the two sides are for all practical purposes one and the same.

If one lower limb is paresed, the non-paralysed leg is tested first, i.e., the heel of the paralysed leg is placed on the air-cushion whilst the extended healthy limb is voluntarily elevated. The test is then reversed, and a reading is taken when the patient attempts to raise the paralysed limb.

In old-standing cases of organic hemiplegia (but not sufficiently severe to prevent the patient raising the limb against gravity), when the healthy limb is elevated, the maximum reading in the air-cushion is sustained as usual at a certain figure, say 52 mm. of mercury; whereas elevation of the paralysed limb produces a maximum reading under the contralateral heel which is not only lower, say 40 mm., but is poorly sustained, gradually declining, say to 34 mm., as the feeble limb fails to maintain the elevation and a lesser contralateral pressure is called for.

When the hemiplegia is recent and progressive, it is observed that attempts to elevate the palsied extremity produce a far greater contralateral pressure under the non-affected heel than occurs when the normal limb is elevated. In a patient thus tested, with 30 mm. as a basis, the readings were as follows: Active elevation of the normal lower limb gave a sustained reading of 34 mm. beneath the heel of the paralysed limb; whereas attempts to elevate the paralysed limb gave a reading of 70 mm. backward pressure by the normal heel. The attempt by the patient to raise the paralysed limb brought forth an unconscious effort on the part of the unaffected lower limb, thereby producing an increased contralateral backward pressure. On the other hand, when the normal limb was elevated, only a slight pressure was exerted backwards by the heel on the paralysed side, owing to the patient's inability to fix the paralysed muscles; as a consequence little or no contralateral assistance was given to the sound limb, and there was a correspondingly low reading by the manometer.

In hysterical paralysis of the lower limb there is absence of increased contralateral pressure, and sometimes actual diminution of pressure, in the unaffected limb.

ICTERUS NEONATORUM.

Frederick Langmead, M.D., F.R.C.P.

Concerning the *etiology* of this disorder, our understanding is still only in the stage of hypothesis, and whether it is hæmatogenous or hepatogenous primarily is a matter of dispute. E. Farquhar Murray,¹ who studied 337 infants, found that 68 per cent were jaundiced soon after birth, its onset being on the first, second, third, or fourth day, most commonly on the first and rarely on the third or fourth. The duration varied from twenty-four hours to apparently several weeks, but was usually less than a week. The earlier the onset the severer was the jaundice, the delayed onset preceding a mild attack. The effect of the jaundice was not negligible, and there was a definite relation between the size of the child and its liability to jaundice, the tendency being greater in smaller children. The amount of blood obtained from the placental circulation before ligation of the cord definitely influenced the incidence of jaundice, a normal amount and excess being antagonistic, whilst a small amount predisposed. Cold also rendered the infants liable. Prematurity *per se* appeared not to be a causal factor, though such babies being small and usually weak had therefore a small blood content. Asphyxia exerted some influence, for such babies commenced life with a low blood-count; but sex, the condition of the umbilicus, and the methods of feeding could be excluded from the etiology of simple icterus neonatorum. In view of these findings, he suggests that when early separation is necessary the cord should be ligatured as far from the child as possible, so that when it revives it can aspirate the blood in the attached cord. It may be advisable, he thinks, to supply such babies with serum or blood obtained from the mother, or by aspirating the residual blood in the placenta, or even by horse serum.

Sir Humphry Rolleston² points out that in simple icterus neonatorum the recent van den Bergh test has shown that the bilirubin in the blood serum is the same as that in hæmolytic jaundice, and differs from that of obstructive jaundice. Of the *grave familial form* of jaundice in new-born children he collected 130 cases in 1920. It may be hereditary and is definitely familial, but is less prone to attack the first- and second-born than the later children in the families affected. It resembles physiological jaundice in its post-mortem findings, especially in the selective staining of the lenticular and other cerebral nuclei, and clinically in the early onset of a febrile jaundice, with bile in the fæces but bile pigment often absent from the urine. The prognosis is very difficult, however, 77 per cent of the cases proving fatal. The surest guide to diagnosis is the history of other cases in the family, at least until drowsiness is apparent. Two rare sequels are a green colour of the teeth and cerebral diplegia. Acting on the assumption that the jaundice is due to a maternal toxæmia, pregnant mothers of infants who have died of the disorder have been treated prophylactically with Hexamine, Sodium Salicylate, minute doses ($\frac{1}{20}$ gr.) of Calomel, and Hydrargyrum cum Creta, and this has been followed by freedom of the infant in a number of cases. As curative treatment of the infants, breast feeding should be discontinued, and minute doses of Calomel given. Two infants treated by H. Williamson have recovered after hypodermic injections of 5 c.c. of Horse Serum, daily, until 20 c.c. were given.

Congenital obliteration of the bile-ducts causes a definitely obstructive and progressive jaundice, hepatic and splenic enlargement, and, later, hæmorrhages. This picture is simulated by the rare condition of *syphilitic stenosis of the common bile-duct*, though in the latter other evidences of syphilis may be present, such as a positive Wassermann reaction. Congenital syphilis alone seldom produces jaundice, unless the liver is secondarily infected. The jaundice which results from infection spreading from the umbilicus, the skin, or the intestine in the new-born accompanies a very fatal septicæmia; it is marked by fever, and is

usually deferred until about the fifth day of life. *Chronic hæmolytic jaundice* may be congenital, and at first resembles physiological icterus in its manifestations and its favourable prognosis. It has been reported to have been associated with congenital syphilis (Fournier and Joltrain). Acute yellow atrophy is extremely rare in the new-born, but an acute secondary infection of the liver of congenital syphilis, giving rise to the changes of acute atrophy, has been recorded.

REFERENCES.—¹*Edin. Med. Jour.* 1922, July, 93; ²*Practitioner*, 1922, July, 1.

IMPETIGO CONTAGIOSA. (See also SKIN DISEASE IN CHILDREN.)

E. Graham Little, M.D., F.R.C.P.

Knowles and Munson¹ describe two epidemics of this disease occurring in two hospitals. The eruptions developed in each case a few days after birth, and became widely scattered. In the first epidemic, of six cases, all recovered. In the second epidemic, of four cases, two who were operated upon for hare-lip died from the wound becoming septic: the operation, it is fair to say, was undertaken before the eruption declared itself. Impetigo has usually been regarded as a streptococcal infection, and it is interesting to note that all six cases in the first epidemic gave a pure culture of *Staphylococcus aureus* in material derived from unruptured blebs. Cases of impetigo occurring in children's wards should be immediately isolated, and every care exercised by nurses handling them to avoid spreading the disease.

Thibierge² urges the importance of mild antiseptics in the treatment of this condition, and recommends the following formula as a first dressing: Zinc Sulphate, 1; Sodium Chloride, 6; water, 1000; this is applied as a compress, using several layers (8 to 10) of gauze. For raw surfaces he prefers application of 2 per cent Silver Nitrate lotion to all others. Later on ointment may be used, e.g. :—

R	Boric Acid	5 grm.	|	Vaseline	25 grm.
	Zinc Oxide	20 grm.	|		

Or, if there is any inflammation of the skin :—

R	Ichthyol	5 grm.	|	Vaseline	25 grm.
	Zinc Oxide	15 grm.	|	Lanolin	10 grm.

Or, for extensive raw surfaces :—

R	Lead Subacetate	0.5 grm.	|	Zinc Oxide	20 grm.
	Salicylic Acid	1.0 grm.	|	Vaseline	30 grm.

The ointment is reapplied each day, and the affected surfaces are well washed with hot water, naphthol or coal-tar soap, or by means of swabs soaked in ether. So long as any raw surface remains, this should be painted over with the nitrate of silver solution.

In the case of children, the dressings must be well protected until healing is completely established, so as to prevent scratching.

INCONTINENCE OF URINE.

Sir John Thomson-Walker, F.R.C.S.

Goljanitzki¹ has devised an operation for incontinence of urine after spinal injury, for the details of which the reader is referred to his article.

Zuber² reports 10 cases of enuresis in children in whom the alkaline or hypochloric urine was rendered acid with successful results.

Discussing the operative cure of incontinence of urine in the male on the basis of 10 of his own cases, Young³ divides these cases into four groups: (1) Post-operative incontinence following urethrotomy and perineal prostatectomy (3 cases); (2) Vesico-perineal fistula with incontinence following fracture of the

pelvis (3 cases); (3) Incontinence from vesico-perineal fistula associated with a dermoid cyst of the prevesical space (1 case); (4) Incontinence associated with epispadias (3 cases). Each case must be studied on its own merits. The operation varied according to the findings, and in the ten cases discussed excellent results were obtained. In some the defect is posterior, and excision of scar tissue and plastic restoration of the sphincters must be done along the floor of the urethra through both a suprapubic and a perineal incision. With the defect along the roof of the urethra, as in epispadias, excision and plastic restoration must be along the roof. Where the condition is due to fistulae which run parallel to the urethra, the restoration of a normal urethra, the excision of strictures, and the closure of fistulae are carried out, with, if the internal and external sphincters have been injured, a plastic restoration of these.

Unger and Hóring,⁴ in a paper on the operative treatment of incontinence of urine in women, describe with illustrations the application of the Goebell and Stoekel method. A vertical flap 8 cm. long and 4 cm. wide is cut in the muscular tissue above the symphysis. The flap is slit to form two strips, which are brought down toward the vagina and sutured together, thus embracing the urethra and exerting enough pressure to insure continence.

Hallowes⁵ insists that electrical treatment is often of real benefit in women suffering from this condition after confinement. In many cases faradism is beneficial, one pad being placed over the lumbar enlargement of the spinal cord and attached to an electrode, the other electrode being a metal sound or catheter introduced into the urethra but not into the bladder. Fifteen minutes' daily treatment for about three weeks should be given with a weak, but gradually increasing, faradic current. During the course of treatment patients should make a rule to urinate daily at fixed hours and thereby establish a habit. The benefit may be permanent or temporary, when it is advisable to repeat the treatment after six weeks' or two months' interval.

REFERENCES.—¹*Surg. Gynecol. and Obst.* 1923, Jan., 49 (abstr.); ²*Bull. Soc. Pédiat. de Paris*, 1922, xx, 193; ³*Jour. of Urol.* 1922, Nov., 361; ⁴*Zeits. f. urol. Chir.* 1923, March 29, 96; ⁵*Practitioner*, 1922, Nov., 400.

INFANCY, HÆMORRHAGIC PACHYMENINGITIS IN.

Frederick Langmead, M.D., F.R.C.P.

This disease would appear to be less rare in infants than is usually supposed. As the name implies, its main pathological feature is a hæmorrhagic inflammation of the inner surface of the dura, but whether the inflammatory changes are reactionary to the hæmorrhage or are primary and bring bleeding in their train is a moot point. Contrary to the usual opinion, Wohlwill, after studying the gross and microscopical anatomy, concluded that there is a primary proliferation of the subendothelial tissue, and that in neither the traumatic cases nor in those accompanying the hæmorrhagic diathesis does the structure of the membrane favour an origin through organization of a hæmorrhage. Marie, Roussy, and Laroche, by experiment on dogs and rabbits, came to a similar conclusion. Various infections, especially syphilis and tuberculosis, and the hæmorrhagic diseases, have been regarded as causes, whilst Rosenberg considers that it is a consequence of cavernous sinus thrombosis.

SYMPTOMS.—According to C. W. Burhans and H. J. Gerstenberger,¹ the symptoms may be gradual or sudden in onset, and generally speaking are those of increased intracranial pressure or meningeal irritation. Vomiting and convulsions are the usual reasons for bringing the patient for treatment. Bulging fontanelle, enlargement of the head, cervical or general rigidity, increased reflexes, muscular twitching, paralysis, hyperæsthesia, somnolence, increased pulse tension, and alterations in the respiratory rhythm are among the symptoms.

Fever may be absent, and if present is not high, except just before death. Retinal hæmorrhage is the most characteristic sign and is present in most cases, while rare in other disorders of infancy. There may be choked disc or optic atrophy. The spinal fluid may be normal or contain evidence of old or recent hæmorrhage. The diagnosis is rendered almost certain by puncture of the anterior fontanelle outside the longitudinal sinus, when a yellow or bloody fluid is obtained. The fluid does not clot on standing, though there may be a small fibrin clot or pellicle. Briefly, if an infant more than four weeks old, usually between the ages of six and eighteen months, has symptoms of greatly increased intracranial pressure and a normal spinal fluid, internal hæmorrhagic pachymeningitis is one of the first things to consider. Retinal hæmorrhage makes the diagnosis almost certain, and the withdrawal of yellow subarachnoid fluid or one containing red blood-cells by fontanelle puncture is pathognomonic. If the disease has been going on for some time, the head will probably be enlarged.

The mortality is low, but the infants succumb readily to intercurrent infections, especially bronchopneumonia. A permanent disability often results—chronic hydrocephalus, imbecility, blindness, deafness, paralysis, spasticity, speech defect. Rosenberg found that 70 per cent of a small number of his cases had some defect eight or nine years after this illness.

TREATMENT.—The treatment is mainly symptomatic. Drainage by repeated puncture through the anterior fontanelle has been performed, but may be harmful. Transfusion or intramuscular injection of whole blood may be used to control the bleeding. Syphilis should be treated if diagnosed.

Following this résumé, the authors report 5 cases which occurred within their clinic in three years. Infections could be excluded in every case except one, where syphilis provided a possible factor. The state of nutrition was good in 3 of the 5 patients; the other 2 were ill-nourished, but the malnutrition was as likely to be secondary as primary. Trauma could be implicated as a factor in 4 of the 5 cases. It seemed that subacute pachymeningitis from birth-hæmorrhage, rendered acute by further physical injury, would explain the development in some of the cases.

REFERENCE.—*Jour. Amer. Med. Assoc.* 1923, March 3, 604.

INFANT FEEDING.

Frederick Langmead, M.D., F.R.C.P.

BREAST FEEDING.—Margaret Harper¹ summarizes her experience of the means by which the difficulties of breast-feeding may be overcome by recapitulating certain truths which are so important that they cannot be repeated too often, especially as they still seem to be so often disregarded. All mothers, with the rarest exceptions, can suckle their infants either wholly or partially, and only very rarely does mother's milk disagree with the infant. If it is fretful, not gaining weight, and not behaving normally, the quantity and not the quality of the milk is probably at fault, or there is some mismanagement of the details of feeding. The milk can be increased by regular stimulation of the breasts by putting the infant to them at proper intervals, provided that it is assured that the breast is completely emptied at each meal, either by the infant or by manual expression. Even when the infant has been weaned entirely for some weeks (as long as six weeks in some cases), breast feeding can be re-established by regular stimulation of the breasts by the suckling infant, manual expression, and artificial stimulation by massage and alternate hot and cold sponging. In the case of premature infants the breasts can be stimulated to secrete by artificial means until the infant is strong enough to suck. In cases of difficulty, complementary rather than supplementary artificial feeding is required.

H. Dietrich,² writing from Los Angeles, criticizes the frequency with which infants are weaned, and the inadequate reasons given, in a paper which could be equally applicable to this country. It is based on 1000 records of almost consecutive cases seen in private practice: 370, or 37 per cent, were breast-fed for three months only or less, while 40 per cent were nursed for eight months or more. Nine per cent of mothers nursed for less than a week, and 139 mothers for less than a month. Of those weaned, in only 84 cases were complementary feeds advised or given, while in practically all the others the child was weaned without an effort being made to estimate the quantity of breast milk. Fifty reasons were given for weaning, of which only nine could be held to be sufficient justification. His figures show the much longer continuance of breast feeding after complementary feeding than after supplementary. To remedy this state of affairs he recommends that much more attention should be given to this subject both in medical literature and discussions, so that doctors may realize its importance.

ARTIFICIAL FEEDING.—R. J. Melman³ gives a description of the method he employs, which has proved satisfactory in most cases. Certified cow's milk is selected, and the mother is instructed to follow certain rules: (1) To procure seven bottles, which she is instructed how to take care of. (2) To feed the infant at intervals of three hours, and to give a bottle of boiled water between the feedings. After the age of one month to give also one teaspoonful of orange-juice twice daily at 8 a.m. and 4 p.m., well diluted with water, and to increase this amount as the child grows older. (3) To give the child one ounce more than its age in months until it reaches the eighth month. (4) To prepare the mixture in the morning for a twenty-four hours' supply, to save time and prevent contamination. (5) She is instructed also in the position of the child and bottle while nursing, and in the kind of nipple. The diluents used are boiled water in normal cases, barley-water when there is diarrhoea, and oatmeal-water in constipation. Occasionally vegetable extracts are employed. With regard to the preparation of the mixture, he instances an infant a month old which would require seven feedings of 2 oz. each, 14 oz. in all. The percentages adopted are $1\frac{1}{2}$ per cent of fat, 5 per cent of sugar, $1\frac{1}{2}$ per cent of protein. Avoiding fractions the formula would read: 5 oz. of milk, 11 oz. of diluent, and 4 level teaspoonfuls of sugar. If the child progresses satisfactorily, the mother is told to add $\frac{1}{2}$ oz. of milk every ten days and deduct $\frac{1}{2}$ oz. of diluent. Thus at the end of the second month the child would take $6\frac{1}{2}$ oz. of milk and $9\frac{1}{2}$ oz. of diluent, and the same amount of sugar (4 teaspoonfuls), i.e., 1.6 per cent of fat and of protein. But now it requires 3 oz. at each meal instead of 2 oz. The formula therefore would be 9 oz. of milk, 13 oz. of water, and 6 teaspoonfuls of sugar for seven feedings. The process is repeated until the fifth month, when the substitution of $\frac{1}{2}$ oz. of diluent by milk is performed every five days instead of every ten; whole milk is given at nine to ten months. Cereals are added after the seventh month.

Condensed Milk.—Variot,⁴ from eight years' study of condensed milks in infant feeding, dislikes the unsweetened forms, since they are heated to so high a temperature that the accessory food factors are destroyed. On the other hand, his experience with 5000 infants leads him to conclude that scurvy need not be feared with sweetened milk evaporated at 50° C. This agrees with English clinical opinion, but sweetened condensed milks are generally held to be liable to cause rickets.

Dried Milk.—As the result of a study in Boston undertaken by the United States Public Health Service, a report⁵ has been issued which confirms earlier observations that there are now available dried-milk powders from which products may be reconstituted which are safe for infant feeding, and in some

cases may have distinct therapeutic value. The gains in weight and physical development of infants nourished on such food were satisfactory. From the standpoint of bacterial dangers, powdered milk, and especially whole-milk powder, can be safely used when a good grade of fresh cow's milk is not obtainable. Concerning the essential vitamins, the powders are still *sub judice*, but it appears that there is not necessarily a destruction of the whole of vitamin C. Safe practice, however, still dictates the use of **Fruit or Vegetable Juices**. No plea is made, and this is of moment, to supplant fresh raw milk in its position as the most desirable substitute for breast milk.

Honey.—Luttinger⁶ writes in favour of using bees' honey as a routine component of all formulæ for substitute infant feeding, in preference to lactose or maltose, as the result of observing 419 cases in which it has been used. He is also using it more and more frequently in marasmus, rickets, scurvy, and malnutrition, instead of sugar, cod-liver oil, or patent foods.

Vitamins.—R. H. Coward and A. J. Clark⁷ have examined the vitamin content of the following proprietary preparations: metagen, maltoline, roboline, virol, vitmar, Mellin's food. The experiments were conducted by feeding young rats on the various foods. They came to the conclusion that in none of the cases examined have the manufacturers succeeded in concentrating vitamins on a commercial scale, and that no advantage is to be gained by trying to obtain vitamins in the form of drugs.

REFERENCES.—¹*Med. Jour. of Australia*, 1922, Sept. 30, 373; ²*Jour. Amer. Med. Assoc.* 1922, July 22, 268; ³*N. Y. Med. Jour.* 1922, Aug. 16, 221; ⁴Quoted in *Jour. Amer. Med. Assoc.* 1922, Aug. 19, 687; ⁵T. Clark and S. D. Collins, *Pub. Health Report*, 37, 2416, Oct. 6, 1922, quoted in *Jour. Amer. Med. Assoc.* 1922, Nov. 18, 1769; ⁶*N. Y. Med. Jour.* 1922, Aug. 2, 153; ⁷*Brit. Med. Jour.* 1923, i, 13;

INFLUENZA.

J. D. Rolleston, M.D.

EPIDEMIOLOGY.—In his thesis on the pandemic of 1918-19 in the French colonies, A. Fouquier¹ states that influenza presented the same features in the colonies as in Paris. Thoracic forms were the most numerous, as might be expected among populations living in the open air. Nervous complications were exceptional. The morbidity ranged from 50 to 80 per cent of the whole population, and the case mortality from 4 or 5 per cent to 25 per cent. Europeans were, generally speaking, less affected than the natives. The mortality was highest in the villages, on account of their complete isolation and the absence of all medical aid. The special features of gravity of the pandemic in the French colonies were the susceptibility of certain races to pneumococcal infection, and pre-existing disorders, such as malaria, tuberculosis, amoebiasis, and cardiorenal changes following alcoholism.

BACTERIOLOGY.—J. G. Adami,² discussing the great influenzal outbreak of 1918, maintains that: (1) One agent and one only was primarily responsible for the cases of the pandemic; (2) This agent was the influenza bacillus; (3) In the majority of cases other organisms invaded the lungs and were responsible for many of the conditions found in the fatal cases.

P. K. Olitzky and F. L. Gates³ have isolated a filter-passing organism named *Bacterium pneumosintes* from the nasopharyngeal excretions in the early hours of uncomplicated influenza. It is a minute bacilloid body from 0.15 to 0.30 μ in length, longer forms being occasionally seen. It grows only in media enriched with fresh animal tissue or defibrinated rabbit blood, and under strictly anaerobic conditions. Intratracheal inoculation of cultures into rabbits produces a febrile disease, with leukopenia, pulmonary oedema, and emphysema.

PATHOLOGY.—According to J. G. Adami² a cardinal feature in the cases of the 1918 epidemic was the regular presence of tracheitis. The larynx and

uppermost rings of the trachea usually escaped, but the bifurcation and lower third of the trachea were almost constantly acutely inflamed, and desquamation of the ciliated epithelium of the trachea and bronchi took place. This acute desquamative tracheitis and bronchitis removed the barrier to invasion of the lungs by inhaled micro-organisms, and explained the great frequency of secondary invasions in influenza. There was comparatively little invasion of the air-cells.

SYMPTOMS AND COMPLICATIONS.—F. H. McCrudden⁴ describes four cases illustrative of *chronic pulmonary disease* following influenza, which is commonly mistaken for pulmonary tuberculosis and frequently for heart disease. He has not seen any fatal cases. The physical signs in the lungs suggest diffuse changes, which may be confined to the bases but rarely if ever to the apices. Bronchitis may be in evidence, and a slight degree of bronchiectasis is sometimes present. Emphysema is well marked in some cases, and some degree of diffuse fibrosis may be found. Pleural thickening, especially at the bases, is common.

From observations on 106 cases of influenza, S. Menti⁵ came to the conclusion that this disease has an unfavourable influence upon the *heart*. Circulatory disturbances developed which had hitherto been latent, or, in the case of valvular defects, had been well compensated and given rise to no symptoms. Cardiovascular disorders which had already caused some symptoms before the attack of influenza showed a considerable aggravation. In another group consisting of subjective cardiac disturbance without any anatomical lesion, a general asthenia was noted, although little was to be found on physical examination. In both groups there was a disturbance of the pulse rhythm, which Menti attributes to a change in the conductivity of the heart muscle similar to what occurs in convalescence from diphtheria. The symptoms in both groups were very slow in disappearing, and ordinary treatment, especially digitalis, failed, so that Menti concluded that cardiac cases which did not react promptly to digitalis were due to influenza. J. B. Cohen and D. Greenberg⁶ report a fatal case of *subacute malignant influenzal endocarditis* in a man, age 45, following an attack of nasopharyngitis with a possible latent sinusitis.

G. R. Lafora,⁷ who maintains that influenza is a frequent cause of spinal and cerebral *serous meningitis*, records a case in a woman, age 35, of paraplegia due to circumscribed serous meningitis following a severe attack of influenza complicated by bronchopneumonia. Complete recovery followed two lumbar punctures.

L. Hollander⁸ reports a case of *post-influenzal herpes zoster*. The patient was a woman, age 63, who had a mild attack of influenza from which she made a slow recovery. The following year she had another attack, succeeded by an eruption of herpes zoster along the course of the left sciatic nerve, and a third attack of influenza the next year, followed by herpes along the entire course of the eleventh dorsal nerve, beginning in the median line of the back, extending under the breast to the midclavicular line, and followed by brachial neuritis. Hollander suggests that after the first attack of influenza the infection became dormant in the posterior root ganglia and appeared as a chronic infection, with exacerbations at a time when the patient's resistance was lessened by an intercurrent infection.

E. Hoffmann⁹ records two cases of *acute sclerœdema* following influenza, one in a girl, age 7, and the other in a woman, age 20. The face, tongue, eyelids, upper limbs, and hands were affected in the former, and the face, scalp, neck, tongue, lower lip, shoulders, arms, and back in the latter. The girl made a complete recovery, and the woman at the time of publication showed some improvement. Hoffmann, who has collected 14 cases of acute sclerœdema

including his own, emphasizes the association of this condition with influenza, as 8 had occurred after influenza, 1 after bronchitis, 1 after a chill, 1 after scarlet fever, and 1 after mumps. In one case an aggravation of the sclerœdema had taken place on relapse of influenza.

SURGICAL COMPLICATIONS.—H. Czermak¹⁰ points out that owing to the extraordinary weakening of organic resistance produced by an attack of influenza the system is predisposed to general septic diseases which run a fulminating course. The practical significance of this is that: (1) During an epidemic of influenza, surgical procedures, especially in the region of the upper respiratory tract, should be confined to urgent operations; (2) In all surgical cases an inquiry should be made as to an attack of influenza within the last four months; (3) Cases of influenza occurring in surgical wards should be strictly isolated, and surgical patients should be carefully protected during an epidemic of influenza from any possibility of infection.

In a discussion on the occurrence of *abdominal symptoms* in influenza, J. Dubs¹¹ states that two groups of cases may be distinguished. In the first, abdominal symptoms appear at the beginning of the disease before pulmonary manifestations have developed. In such cases, in addition to the general symptoms of influenza, local signs of appendicitis may be present (*a*) in the form of spontaneous pain more or less limited to the ilœcœcal region, (*b*) in a severe form simulating perforative peritonitis and due to diaphragmatic pleurisy. In the second group the abdominal symptoms first appear some time after the onset of influenza complicated by pulmonary symptoms, and may be due to (*a*) neuritis of the nerves of the abdominal wall, (*b*) pulmonary or pleural complications, (*c*) independent or metastatic appendicitis. In the first group the diagnosis is usually easy, while in the second group the answer to the question, "Has an appendicitis supervened on an already existing influenza, or do the symptoms merely simulate appendicitis?" may be very difficult, because either occurrence is possible.

Esau¹² refers to the cases reported by Schmieden (*see* MEDICAL ANNUAL, 1920, p. 184), and describes several cases of acute serous peritonitis in influenza as well as cases simulating intestinal obstruction, subphrenic abscess, and renal disease.

K. Ochsenius¹³ records a case of *coxitis and spontaneous dislocation* of the right hip-joint in a female infant, age 10 months, suffering from influenza, which was also complicated by double otitis media, *B. coli* pyelocystitis, and convulsions. X rays showed a dislocation of the head of the right femur backwards and upwards. The dislocation was reduced, and recovery of the function of the joint took place.

H. Zweig¹¹ reports a fatal case of *osteomyelitis* of the left femur caused by *B. influenzae* in an infant, age 4 weeks, in association with tuberculous infection of the nasopharynx, middle ear, and regional lymph glands. Only two similar cases of the presence of *B. influenzae* in the bone-marrow have been recorded, by Mitterstiller. In both these cases the radius was involved and the patients were adults. In all the other cases of post-influenzal osteomyelitis published, the causal agent was the streptococcus or was not identified. Zweig suggests that the rarity of osteomyelitis due to *B. influenzae*, in spite of the extraordinary prevalence of influenza in recent years, may be due to the bone-marrow possessing some power which inhibits the invasion and growth of this bacillus.

Engelen¹⁵ reports several cases of *epididymitis* with a recent history of influenza and no clinical evidence or history of gonorrhœa. The subacute course suggested tuberculosis or malignant disease, but the condition cleared up under conservative treatment in a few weeks.

M. E. Roch¹⁶ states that the *aural complications* of the influenza epidemic of 1918-20 observed at the Oto-rhino-laryngological Clinic of Basle University showed some resemblance to those seen in the epidemic of 1889-90, though the number of cases was smaller in the recent epidemic. The mastoid was more frequently affected than in the case of ordinary otitis, there being 104 cases of mastoid disease in the clinic from July, 1918, to the end of May, 1920, as compared with 59 during an equal period in previous years. Involvement of the internal ear was more frequent than in the epidemic of 1889-90.

G. Bilancioni¹⁷ reports 5 cases of more or less severe *primary influenzal mastoiditis* without any sign of inflammation in the middle ear. In four cases recovery took place under medical treatment, and the fourth required operation, when acute purulent osteomyelitis was found.

A. V. Denti¹⁸ reports three cases of *dendritic keratitis* which occurred in adults in convalescence from mild attacks of influenza. The prognosis in such cases is always good, unless secondary infection occurs.

Influenza in Children.—E. Weill and A. Dufourt¹⁹ remark that while in certain countries, or at least in certain towns, influenza appears to be a mild disease, during the epidemic of 1918-19, 47 out of 167 cases in the children's clinic in the Charité Hospital at Lyon were fatal, a mortality of 28.1 per cent. The death-rate was highest among infants, 11 out of 35 cases proving fatal, a mortality of 31 per cent. On the other hand, Reh and Schiff in 1918 had only 3 deaths among 58 infants. Weill and Dufourt found that there was no relation between the severity of the mother's attack and that of the infant, as a nursing mother might die while the baby was only slightly indisposed.

TREATMENT.—For the acute rhinitis of influenza G. Seccombe Hett²⁰ recommends four-hourly inhalations containing Tinct. Benzoin. Co. If there is middle turbinal pressure, the application of Cocaine to the middle meatus will reduce congestion, allay pain, and promote drainage. If earache begins, Glycerin. Acid. Carbol., glycerin. ad 1 oz., will often soothe the pain.

In all cases of severe influenza Cassaët²¹ recommends intravenous injection of the neutral Bihydrochlorate of Quinine. The injections should be given daily, or twice a day in very severe cases, in doses of 5 c.c. of a solution containing 10 cgrm. of quinine bihydrochlorate to each c.c. of sterile water. In certain cases, e.g., cardiac patients, the intravenous injections should be followed by repeated intramuscular injections.

REFERENCES.—¹*Thèse de Paris*, 1922, No. 318; ²*Lancet*, 1923, i, 665; ³*Jour. of Exper. Med.* 1922, xxxv, 813; ⁴*Jour. Amer. Med. Assoc.* 1923, i, 609; ⁵*Zentralbl. f. inn. Med.* 1923, 10; ⁶*Jour. Amer. Med. Assoc.* 1922, i, 1382; ⁷*Siglo med.* 1922, 540; ⁸*Jour. Amer. Med. Assoc.* 1923, i, 470; ⁹*Klin. Woch.* 1923, 963; ¹⁰*Arch. f. klin. Chir.* 1923, 716; ¹¹*Schweiz. med. Woch.* 1922, 362; ¹²*Med. Klinik*, 1923, 168; ¹³*Deut. med. Woch.* 1922, 1721; ¹⁴*Monats. f. Kinderheilk.* 1923, 308; ¹⁵*Deut. med. Woch.* 1922, 1347; ¹⁶*Schweiz. med. Woch.* 1922, 528; ¹⁷*Polichinico*, 1923 (Sez. Prat.), 140; ¹⁸*Osp. Maggiore*, 1922, 183; ¹⁹*Arch. de Méd. des Enf.* 1922, 385; ²⁰*Practitioner*, 1922, ii, 298; ²¹*Gaz. hebdom. des Sci. méd. de Bordeaux*, 1923, 279.

INSULIN.

John D. Comrie, M.D., F.R.C.P.E.

The therapeutic use of insulin is detailed, with its dosage under different conditions, in the article DIABETES MELLITUS. Some further theoretical considerations are given here. An elaborate account of the steps which led to the discovery and isolation of this hormone was given by Macleod¹ in a communication to the Eleventh International Physiological Congress at Edinburgh. The function of insulin is in some way related to the preparation of the glucose molecule for combustion, possibly by changing the sugars of the blood into gamma-glucose. The action of insulin on the metabolism of fat is as striking as its action in respect to carbohydrates. When insulin is given along with carbohydrates to depancreatized and diabetic animals, acetoneuria

promptly vanishes, the fat in the blood more slowly disappears, and in a few days the fat with which the liver is loaded disappears also and is replaced by glycogen as in the healthy animal. As regards the effect on blood-sugar, within a few minutes of the intravenous or subcutaneous injection of a moderate dose of insulin, the sugar of the blood begins to fall, and continues doing so for a period of half an hour to several hours. This effect is not, however, produced by an action on the blood itself, but by one which causes the tissue cells to absorb sugar from the blood. This is clear from experiments in adding insulin to defibrinated blood outside the body, when no influence is exerted upon the rate at which sugar disappears. Hypoglycæmic symptoms supervene when, following upon injection of insulin, the blood-sugar has fallen to about 0.045 per cent. In rabbits the chief symptom consists in convulsions similar to those of strychnine poisoning. These symptoms vary much in character according to both the state of nutrition of the animal and the kind of animal used. The standardization of insulin being made, as described in the MEDICAL ANNUAL for 1923, from the onset of these phenomena, is thus, according to Macleod, rendered considerably more difficult.

Since the discovery of insulin, this and similar bodies have been found to be widely distributed. Thus Macleod² has isolated insulin from the pancreas of numerous teleostean and elasmobranch fishes; Collip³ has prepared it from clams, and suggested that it must be present wherever glycogen is found. Collip has also isolated a similar substance from yeast and other vegetable sources, to which he has given the name 'glucokinin'.

Various attempts have been made to introduce insulin into the system otherwise than by injection. Telfer⁴ has succeeded in producing hypoglycæmia by inunction of large amounts of insulin mixed with fatty substances and rubbed into the skin of rabbits; he suggests that this means might be employed for therapeutic purposes and a cruder preparation of insulin used. Crespiigny,⁵ as well as others, has attempted unsuccessfully to use it by mouth; his method was to administer a dose of charcoal one hour before the insulin with the object of absorbing the destructive stomach enzymes.

The unit of insulin has been changed during the past year.⁶ As originally defined, the 'physiological unit' was that amount of insulin which lowers the percentage of sugar in the blood of a normal rabbit weighing 2 kilo. and previously starved for twenty-four hours, to 0.045 per cent within three hours. As this unit is inconveniently high for therapeutic purposes, the 'clinical unit' now universally adopted in labelling preparations of insulin is one-third of this amount. The preparation of the substance is still controlled by the Insulin Committee of the University of Toronto, and in Britain by the Medical Research Council, and is carried out by various licensed manufacturing firms.⁷ Considerable technical improvements have been made in the methods of preparation during the past year,⁸ and at the beginning of 1924 the price is less than one-half of that in the spring of 1923.

REFERENCES.—¹*Brit. Med. Jour.* 1923, ii, 165; ²*Jour. of Metabolic Research*, 1923, Aug. 149 (ref. in *Jour. Amer. Med. Assoc.* 1923, Jan., 278); ³*Brit. Med. Jour.* 1923, ii, 172; ⁴*Ibid.* i, 715; ⁵*Ibid.* 1924, i, 35; ⁶*Jour. Amer. Med. Assoc.* 1923, June, 1848; ⁷*Brit. Med. Jour.* 1923, i, 695; ⁸*Lancet*, 1923, i, 861.

INTESTINAL OBSTRUCTION, SURGERY OF.

E. Wyllis Andrews, M.D., F.A.C.S.

Peterson¹ reports a study of the cases of acute intestinal obstruction in children from the surgical service of the Post-graduate Hospital in New York. Of 55 cases, 46 were due to *intussusception*. This, as is evident, is the first thing to be thought of in any obstruction in a child. Its onset is characteristic. The child is generally a perfectly healthy one without any previous history of such illness.

The attack comes on without warning. Vigorous catharsis was noted in a few of the cases. Sudden acute pain, collapse, vomiting, and one or two copious hæmorrhagic stools occur. A bloody stool may be the first sign. A mass is palpable in many cases, but failure of this sign should not cause one to doubt the diagnosis, as it is not a constant one. Mechanical measures are seldom of value, although one case in this series was thus cured. In those reported by Schwartz² it never did any good. Inflation of the colon with gas or water, or

postural treatments, may have a real danger. Rupture of the distended and weakened gut may result, and, worst of all, valuable time is lost. Schwartz has especially emphasized the fact that nearly all cases operated upon early make a recovery. In all cases the invaginated bowel should be gradually pulled out and no further surgery attempted. Certainly no resection or radical procedures are needed. Of 55 cases, only 2 recurred. In those cases where resection is undertaken the mor-

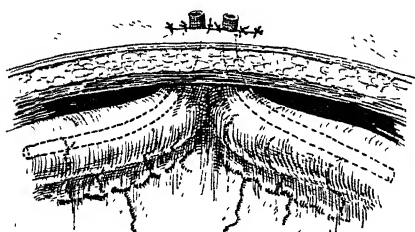


FIG. 57.—Acute ileus (McKenna's operation). Plan of jejunojejunostomy made through small opening in abdominal wall, with two catheters in place. (Figs. 57, 58 redrawn from the 'Journal of the American Medical Association'.)

tality is almost 100 per cent. Stitching of the two loops of bowel in some position which will not favour invagination may be attempted, but is of very doubtful value. The cause of this disease is still quite uncertain. In a few cases tumours, diverticula, or enlarged lymph glands are noted. In the great majority, however, there is no other pathology demonstrable. Overgrowth of the lymphoid tissue in the ileocecal region seems to be the most plausible explanation. This is, however, quite hard to demonstrate, as the bowel is very thick from œdema and inflammatory reaction; and in those cases coming to post-mortem it cannot be said if the hypertrophy of the lymphoid elements in the bowel wall are the result or the cause of the condition.

Acute ileus in the adult may be of two sorts, the toxic and mechanical, and it may be of great importance to distinguish them. Wile³ suggests that this may be done by the following means. The stomach is washed until the return is clear. Then an enema is given of some irritating substance such as magnesium sulphate. If the obstruction is mechanical, the gastrointestinal tract is hypersensitive, and this stimulus will cause prompt resumption of the vomiting and cause pain in the region of the obstruction. If the ileus is paralytic—that is, toxic—the stimulus afforded by such an enema will provoke no result. The tract is hyposensitive, and no pain will be caused, nor will vomiting be resumed.

In most instances cases of ileus come to the surgeon in a very desperate condition. Relief must be afforded at once and with a minimum of shock and

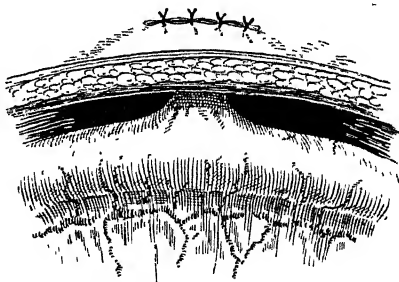


FIG. 58.—Diverticulum produced by performing type of enterostomy described.

trauma. W. J. Mayo⁴ and C. H. Mayo⁵ both are strongly of the opinion that radical surgery is contra-indicated in these cases. All that it is safe to do is to establish drainage and thus save the patient's life. The various resections and intestinal operations necessary before permanent cure is brought about should all be undertaken at a later operation. The mortality from primary radical operations in the acute stage is very high. Shock and sepsis are responsible for many deaths. Intestinal suture work undertaken in such circumstances is very precarious. The bowels are not healthy. They are dilated, often temporarily paralysed, and heal poorly, so that many leakages occur. The proper procedure is to do an enterostomy just above the site of the obstruction, and nothing else. If this were adopted as a routine, our mortality would be far lower. If convenient the colon may be used; but, should there be the slightest difficulty of exposing this region, the last loop of the ileum can always be found at once with a minimum of time lost. Barber⁶ is of the same opinion, but warns against establishing an ileostomy too high up. He reports a case in which one of the loops in the middle of the small bowel was thus opened and all the bowel contents drained out. Death ensued rapidly from dehydration and starvation in spite of the fact that the symptoms of obstruction were relieved.

Many surgeons have been establishing drainage in the upper ileum in these cases. This is in accordance with our knowledge that it is in the duodenum that the toxic products are elaborated. McKenna⁷ describes a method by which this can be done without entirely diverting the intestinal current (*Figs. 57, 58*). A jejunostomy done by this method usually heals spontaneously in a very short time after the tube is removed. In fact, the difficulty is to keep it open as long as is necessary. With a catheter invaginated into the intestinal wall, and this brought to the surface through a very small incision, a diverticulum is rapidly formed which permits a restoration of the normal intestinal flow. Packing about the catheter with omentum is a distinct help. McKenna agrees with Barber that a total drainage of all the intestinal contents produces a surprisingly rapid emaciation, and also that the effect of these high secretions on the skin is very irritating.

REFERENCES.—¹*Surg. Gynecol. and Obst.* 1922, Oct.; ²*N. Y. Med. Jour.* 1922, Oct. 18; ³*Internat. Jour. Surg.* 1922, xxxv; ⁴*Surg. Gynecol. and Obst.* 1923, Jan., 112; ⁵*Jour. Amer. Med. Assoc.* 1922, July 15; ⁶*Ibid.* Nov. 25; ⁷*Ibid.* 1923, June 9.

INTESTINAL STASIS, CHRONIC.

Robert Hutchison, M.D., F.R.C.P.

TREATMENT.—Jordan¹ describes the non-surgical measures to be adopted in the treatment of this condition as follows:—

1. The dropping of the stomach and large intestine is corrected by a **Curtis Belt**.
2. Stasis in the large intestine is met by prescribing liquid **Paraffin**. If the pelvic colon is much elongated, warm saline enemata should be given in addition.
3. Spasm of the sphincters (pyloric and ileocecal) and spasmodic constriction of the large intestine are best overcome by **Belladonna**, 8 or 10 min. of the tincture with a little bicarbonate of soda twice a day after food.
4. Decomposition in the intestines is dealt with most effectively by means of **Colloidal Kaolin**; a dessertspoonful of the kaolin powder is taken in half a tumbler of hot water night and morning.
5. The septic contents of the lower ileal coils must be cleared out by salines. Streptococcal infection of the intestines most often occurs in the lower ileum; few streptococci pass on into the cæcum, and still fewer reach the rectum. This has been proved by withdrawing material from the intestines during abdominal operations. Bacteriologists are able to grow streptococcal cultures from the fæces by giving their patients lactose (with the object of increasing the growth

of streptococci for the time being), and a saline aperient to propel the streptococcal chyle into and through the large intestine. Applying this experience, colloidal kaolin is given to adsorb the intestinal toxins, and a saline aperient to drive onward the contents of the lower ileum.

All the above measures aid one another in breaking the vicious circle of stasis. The paraffin helps the Curtis belt to support the dropped viscera; it makes the faeces specifically lighter than the watery contents of the small intestine, so that the large intestine tends to float up, instead of being the heaviest part of the intestines as it is when full of solid faeces. The belt, in its turn, helps the action of the paraffin and saline aperient by supporting the viscera, abolishing kinks, and preventing traction of the viscera upon the mesenteries. The belladonna helps in three ways: (1) It opens the 'gates' (i.e., the sphincters); (2) It diminishes spasmodic narrowing of the large intestine; (3) It antagonizes the vasoconstrictor action of the intestinal bacterial toxins, and thus acts as a physiological antidote to these toxins.

The advantages to be derived from colloidal kaolin are: (1) It adsorbs bacterial poisons in the intestines, and is a potent and efficient agent in rendering these poisons innocuous; (2) It soothes the mucous membrane; (3) It has a very useful mechanical action in the large intestine. In conjunction with paraffin it converts the faeces into a soft, homogeneous mass which passes through the big bowel readily. Patients who have given up liquid paraffin because it 'runs through' are able to take it in conjunction with colloidal kaolin. With a little care in dosage it is possible to maintain motions that are smooth, soft, and almost odourless like those of a baby.

Vaccines.—Autogenous vaccines are of considerable help in many cases.

Diet.—Correct feeding is of great importance in the treatment of stasis. The details of diet must vary to suit individual needs, but certain principles of diet may be laid down. Articles to avoid are: (a) Those which irritate the mucous membranes, especially alcohol and sharp spices (mustard, cayenne, etc.); (b) Those which decompose readily in the intestines. Meat is the most important of these, and it includes poultry and game. Excess of sugars should be avoided as encouraging streptococci. Foods to take are: (1) Fresh fish; (2) Fresh dairy produce—eggs, milk, cream, butter, cheese; (3) Fresh garden produce—lettuce, fruits, and vegetables; (4) Grains of all kinds, including coarse oatmeal; (5) Nuts. Large meals should be avoided; the 'static' stomach cannot deal with them.

Régime.—The principles of régime may be tabulated thus: (1) Avoid fatigue, whether physical or mental; (2) Retire early and spend a long night in bed. When commencing treatment, it is often well to advise three weeks of complete recumbency, and to impose a rest of two hours after lunch for some weeks more; (3) Cultivate regular habits, and acquire the faculty of having a soft (not liquid) faecal evacuation after each meal. A routine visit to the lavatory after each meal may remain unrewarded at first, but a few weeks' education will enable the bowel to respond satisfactorily—with the aid of paraffin, kaolin, and belladonna.

REFERENCE.—*Lancet*, 1923, i, 432.

INTESTINAL SURGERY. (See also COLON; HERNIA; INTESTINAL OBSTRUCTION.)

E. Wyllys Andrews, M.D., F.A.C.S.

Lockwood¹ has made a very interesting study of *traumatic rupture of the intestine*. Leaving aside those cases of pneumatic rupture due to compressed air being forced into the rectum, the vast majority of cases are due to direct crushing injuries or sharp blows upon the abdomen. It is an exceedingly important fact that this trauma is often of a minor sort and does not seem to

have been severe enough to cause such a serious lesion. A minority of cases are caused by sudden oscillations of the body. In this group the tear generally occurs at some fixed point, such as the duodenojejunal junction or the ileocaecal region. Lesions of the small bowel are about nine times as common as those of the colon. In tears of the small bowel, if the point of impact is above the umbilicus the trouble will usually be found in the jejunum. Lower abdominal injuries tend more to rupture the ileum. These small-intestine lesions are usually transverse, and generally complete. Incomplete tears may occur, and they are often seen at operations on complete tears. They seem to involve the outer coats. As melæna is very rare it can be assumed that tears of the inner coats alone are not common. This has also been demonstrated experimentally.

The symptomatology varies greatly with the extent and location of the injury. The condition of the intestines is also important. In high lesions occurring when the stomach is empty the onset of the symptoms is often delayed even for many hours. There is also a tendency for the redundant mucosa of the small bowel to plug up small holes temporarily, while peristalsis is inhibited by the shock. In most cases, however, the onset of the shock is immediate. The pulse is weak and thready, and the respiration shallow and thoracic in type. A period of subnormal temperature is generally met with. Nausea and vomiting are invariably present. For the first hour or so the intestinal movements are inhibited, but at the end of that time vomiting always begins. It is not bloody unless the lesion is as high up as the duodenum. Nausea is present from the beginning. Pain and tenderness are marked, and most patients recognize at once that the pain is inside the belly and not due to a mere contusion of the abdominal walls. It is deep-seated and tends to radiate to the pelvis or back. Early abdominal rigidity is always noted. Dullness in the flanks, if seen early, is due to hæmorrhage or the outpouring of intestinal contents. Later, it may be due to extravasated fluid from the lining membranes. Absent liver dullness, a classic sign, is of no diagnostic value. It comes on late. The author quotes Berry, who says that it was present in none of the 17 cases in which he operated successfully. Lockwood has not had a recovery in a case where this showed.

Resection is done far too frequently in such lesions. Mere infiltration of the bowel wall with blood does not mean gangrene. Unless the mesenteric connection is destroyed over a considerable area, the viability of the bowel wall need cause no worry. Simple closure of the perforations is all that is necessary in a vast majority of cases. Drainage of the abdominal wound is not indicated unless there is a frank peritonitis, as in very old cases. The great majority should be closed at once, especially in the small-intestine ruptures. Irrigation has been shown to be very definitely harmful, and has no place in the modern surgery of such conditions. Careful mopping up of the extravasated material should, however, be done.

Mitchell² reports a case of *mesenteric thrombosis cured by operation*. The mortality of this condition has been almost 90 per cent. The interesting feature of this case is that it developed while the patient was under careful observation, and it was not until forty-eight hours after the onset that any symptoms developed which would indicate a severe abdominal disease. At the end of forty-four hours after the mild pain began there was no abdominal rigidity or tenderness and the pulse and temperature were not elevated. Then there was a rapid onset of shock, fever, and signs of sepsis. Immediate laparotomy revealed gangrene of about 18 in. of the ileum. In the few hours before operation the patient's condition had gone from practically normal to almost moribund, with a pulse of 180. Operative recovery was uneventful. A persistent slight

diarrhœa resulted from the resection of only 18 in. of small bowel, and the

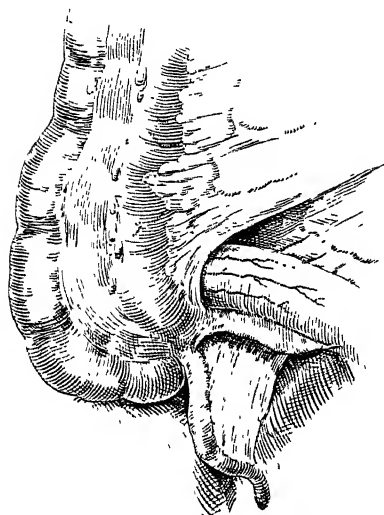


Fig 59.—Sketch from living specimen showing three straight vessels in the last inch and a half of ileum, running parallel with the long axis of the small bowel. Sometimes only one or two vessels are found present. (Redrawn from 'Surgery, Gynecology, and Obstetrics'.)

author calls attention to the fact that function in such cases does not seem to be disturbed in proportion to the amount of bowel removed. In most cases about one half of the small intestine can be removed without danger of starvation, but many cases are on record of gradual emaciation from the loss of very much less. He advises a diet rich in carbohydrates in a readily assimilable form in cases where much small bowel has been resected.

Payne³ calls attention to the *anatomy of the vessels in the terminal ileum*. In the last few inches of the ileum there are several small vessels running in the long axis of the bowel. These empty into the ileocolic vessels about the ileocecal valve. In no other place in the small intestine are there any blood-vessels which run in any direction except transversely around the gut. This may be of considerable assistance in helping one to recognize the last loop of the ileum, or to find the ileocecal valve or appendix. (Fig. 59.)

REFERENCES.—¹Canad. Med. Assoc. Jour. 1923, May; ²Ann. of Surg. 1923, March; ³Surg. Gynecol. and Obst. 1922, Oct.

INTESTINAL WORMS. (See also TRICHINIASIS.)

Robert Hutchison, M.D., F.R.C.P.

Round Worms.—As a result of recent investigations fresh light has been thrown upon the *life history of Ascaris*. It is now known (Ransom¹) that the newly-hatched worms, instead of simply settling down in the intestine to reach maturity, first leave the intestine, pass to the liver, then to the lungs in the blood and lymph circulations, and finally come back again to the intestine by way of the trachea and œsophagus. It has been found experimentally in animals that, in their passage through the lungs, the larvæ sometimes set up a pneumonia, and there is some reason to believe that this may also occur occasionally in the human subject (Nicoll²). This would be most likely to happen if there were a heavy invasion of the lungs by larvæ following upon the ingestion of a large number of eggs at one time. This might take place in the case of children exposed to close contact with soil that has been heavily polluted by fæces either of human beings or of swine.

How the young parasites reach various parts of the body is as follows (Ransom): "The larvæ that hatch out in the small intestine, after the eggs containing them have been swallowed, promptly enter the wall of the intestine; they then pass to the liver in the portal circulation and, after crossing the capillary zone of the liver lobules, enter the central veins, by which they reach the hepatic veins, vena cava, and right side of the heart. The newly-hatched larvæ measure about 0.25 mm. in length and about 0.012 mm. in diameter.

They may pass rapidly through the liver or be delayed for several days, in the latter case undergoing growth and development, before they continue their journey. Some larvæ may be permanently stopped in the liver, become encapsulated, and die there. From the right side of the heart, the larvæ are carried to the lungs, in which they enter the air sacs. Finally, after having developed to a length of from 1 to 2.5 mm. they pass up the trachea and down the œsophagus through the stomach to the intestine, and develop to maturity in about two months. Some larvæ that reach the lungs, however, apparently again return to the heart, and are then distributed to various parts of the body in the peripheral circulation. They may be recovered from peripheral lymph nodes as early as twenty-four hours after the eggs from which they hatched have been swallowed, and have been found still alive in such locations as late as thirty days after infection."

Cases are published from time to time of *surgical complications* caused by the peculiar tendency of round worms to wander. Thus, Rigby³ records a case of acute hæmorrhagic pancreatitis in a woman of 80 caused by a round worm in the pancreatic duct; Novis⁴ a case of partial obstruction of the pancreatic duct from the same cause; and Nicoll⁵ and others⁶ refer to cases in which round worms were found in the bile-passages, Fallopian tubes, and elsewhere. Lefebvre and Baillet⁷ describe four cases in which acute peritonitis following abdominal operation was simulated by round worms. The operations were for chronic appendicitis, ovarian tumour, etc., and in all cases within a few hours the patient became seriously ill and had many of the signs (as well as the facies) of acute peritonitis. The symptoms passed off in each case with the vomiting of a round worm. The condition may be distinguished from peritonitis by its supervening very early after operation, and by the absence of fever and acceleration of pulse. The authors have no satisfactory explanation to offer of the way in which round worms can cause such a clinical picture, and why it should supervene soon after operation.

TREATMENT OF INTESTINAL WORMS.—The reviewer⁸ contributed last year to the *Lancet* an account of the present-day treatment of intestinal worms which may be reproduced here.

Tape-worms.—The secrets of success in the treatment of cases of tape-worm are (1) proper preparation of the patient, and (2) adequate dosage of the vermifuge. The patient should be kept on a liquid diet (1½ pints of milk and 1 of beef-tea) for forty-eight hours. During this period he should remain at rest, preferably in bed, and the bowels should be thoroughly cleared out by an efficient daily aperient—e.g., 1 drachm sulphate of soda three times a day. Early on the morning of the third day he should be given a saline purge, and two hours afterwards the vermifuge should be administered. **Liquid Extract of Male Fern** is usually employed, the dose being 1 drachm for a child and 1½ drachms for an adult. It may be given either in 15-min. capsules or as a draught made up with mist. amygdalæ co., and flavoured with a little oil of peppermint. If the capsules are used, one may be given every quarter of an hour until four or six have been taken. Two hours later a purge should be administered. Castor oil, though often employed, is not to be recommended for the purpose, as some poisonous constituents of male fern are soluble in it. It is better to use **Black Draught** (mist. sennæ co.) or a **Seidlitz Powder**. If the bowels have not acted within an hour they should be emptied by an enema. The motions should be passed into a vessel containing warm water, and should be strained through black muslin to facilitate the search for the head.

Even when the above directions are carefully followed, failure to get away the head will result in a good many instances. In that case there is nothing

to be done but wait until segments reappear in the motions, and then repeat the treatment. Other vermifuges are not likely to be more successful, but **Pelletierine Tannate** is worth a trial. It may be given after the usual preparation of the patient, in a dose of 8 gr., followed in two hours by 1 oz. of castor oil. It is not to be recommended for children below the age of ten.

Before the war I was in the habit of using the preparation known as **Filmaron** with great success. It consists of the active principle of male fern dissolved in castor oil, the dose for an adult being $\frac{1}{2}$ oz. or more. It is a German preparation, and can be obtained from Messrs. Oppenheimer. Chloroform and turpentine have also been used, but in the doses required are not devoid of risk. If chloroform is tried, 1 drachm should be shaken up with 1 or 2 min. of croton oil, and given in half a tumblerful of milk whilst fasting. I have had no personal experience of this plan, but it has been highly spoken of.

Round Worms.—**Santonin** is an effective remedy for this form of parasite. The dose for an adult or a child of twelve years is 5 gr., and for a child of one year 2 gr. It should be given in the morning on an empty stomach, either as a powder, with the addition of $\frac{1}{2}$ gr. calomel and 2 gr. of compound scammony powder, or in an emulsion containing $\frac{1}{2}$ oz. castor oil. 'Yellow vision' and redness of the urine may result, but are of no importance, and disappear in twenty-four hours. As prophylactic measures, all drinking water should be boiled, and raw vegetables avoided or thoroughly washed before consumption.

Thread-worms.—The old-fashioned **Enemata** are often effective if persistently used. The proper strength is 1 oz. of salt to the pint, and the injection should be repeated every other morning for a month. **Infusion of Quassia** may be used instead, in a strength of 1 in 40 (which is stronger than the B.P. infusion), or the salt may be added to the infusion. The injection should be given warm through a funnel and tube, the pelvis being raised. One and a half pints may be given to an adult, and 6 oz. or more to a young child.

A convenient local treatment is the use of **Suppositories** containing 7 $\frac{1}{2}$ gr. of strong **Mercurial Nitrate Ointment**. (In the case of children below the age of four, a smaller suppository may be used.) One of these suppositories is inserted every other night. A little **Blue Ointment** inserted nightly into the rectum is perhaps as good. Amongst internal remedies **Santonin** may be used in the same way as for round worms, or **Male Fern** as for tape-worm. **Sulphur** also is often effective in old-standing cases. It may be used either in the form of a morning dose of a sulphate water, or one or two sulphur lozenges may be given after each meal for prolonged periods. The writer has found it very useful in old-standing cases of thread-worms in adults.

Whatever treatment is adopted, it is important to take measures against re-infection. With this object the child should wear such sleeping garments as make access of the fingers to the anus impossible, and a little white precipitate ointment should be inserted into the anal canal and smeared round the orifice at bed-time. The same precautions should be taken, as regards diet, as in the case of round worms.

In all chronic and recurring cases, the amount of starchy and sugary food should be cut down—patients have been cured by adopting a diabetic diet—and regular action of the bowels ensured either by the use of rhubarb and grey powder or of paraffin. There can be no doubt that the appendix often serves as a breeding ground for thread-worms, and that the bowel can be constantly re-infected from it. In obstinate and old-standing cases in adults, removal of the appendix has therefore been suggested in order to root out the parasites, but I am not aware that operation has ever actually been done solely with this object.

Carbon Tetrachloride has lately been recommended for hook-worm and other infections with intestinal parasites. It acts as a moderate purge, and no previous preparation of the patient is required. **Oil of Chenopodium** is soluble in carbon tetrachloride, and a mixture of the two is said never to fail in dislodging round worms. The following is the standard treatment for adults (Read⁹): One ounce of castor oil is given at night, and the next morning a mixture containing 1 drachm of carbon tetrachloride, 1 c.c. of oil of chenopodium, and $\frac{1}{2}$ oz. liquid paraffin. As a rule the fæces are examined in a week to ten days, and the treatment repeated if necessary. Almost all the patients complain of feeling drunk as an immediate effect for a time varying from a few minutes to a day. As a rule three to four motions are produced in the twenty-four hours following treatment, and these often contain numerous round worms. Occasionally slight vomiting, headache, or pain in the abdomen occurs. The drug appears to have no effect against *Trichocephalus*. (See also ANKYLOSTOMIASIS.)

In Germany a preparation called **Antoxurin** has been recommended as the most potent of all remedies for thread-worms.¹⁰ It is dichlorbenzol, and is given in keratin-coated pills each containing 0.05 grm.; seven to ten are given daily for four days, and on the first and third days a spoonful of castor oil.

REFERENCES.—¹*Jour. Amer. Med. Assoc.* 1922, Sept. 30, 1094; ²*Lancet*, 1922, ii, 1049; ³*Brit. Jour. Surg.* 1923, Jan., 419; ⁴*Ibid.* 42; ⁵*Lancet*, 1922, ii, 1049; ⁶*Abstr. in Surg. Gynecol. and Obst.* 1922, Dec., 412; ⁷*Presse méd.* 1922, July 19, 612; ⁸*Lancet*, 1923, i, 762; ⁹*Brit. Med. Jour.* 1923, i, 1048; ¹⁰*Wien. klin. Woch.* 1923, March 1, 165.

INTRACARDIAC INJECTIONS.

Drs. C. Lian and R. Barriett.

(Translated by Carey F. Coombs, M.D., F.R.C.P.)

This method of injection proposed by Winter¹ in 1905 is worthy of our consideration.²

Indications.—The method is not one to be used indiscriminately, for as Kemal Djenob and Mouchet³ showed, it offers no advantage over the intravenous route, so long as the circulation remains capable of carrying to the heart the drug injected. Henschen, in a critical review,⁴ says that the medical indications are complete arrest of the heart persisting in spite of subcutaneous or intravenous injections of cardiac tonics, for example in cardiac or renal disease or in the infections or intoxications. In surgical practice it is useful in prolonged syncope due to anaesthesia or operation, to traumatic shock, electrocution, etc.

Technique.—A fine needle, 10 cm. long, is used. The injection should be made into the left ventricle. To reach this, according to Baumann,⁵ the needle should penetrate the fourth left space, keeping close to the upper edge of the fifth rib, 5.5 cm. from the left border of the sternum. If the ventricle is hypertrophied, the fifth or even the sixth space should be used. Blan⁶ recommends that the needle be directed outwards and backwards, the thickness of the ventricle wall (1.5 cm.) being borne in mind. After the resistance of the superficial tissues, that of the cardiac muscle is encountered and traversed. In this way the ventricular cavity is reached. The best plan is to use the needle fixed to the syringe and to aspirate gently from moment to moment, so that, as soon as the ventricular cavity is reached, a little blood is aspirated into the syringe. But if it is the right ventricle that is aimed at, as Boden⁷ advised, the fourth left space should be penetrated at the sternal border, keeping close to the upper border of the fifth rib, and tending slightly towards the middle line. If the right heart is engorged, the injection should if possible be preceded by aspiration. According to Biedelung,⁸ it does not much matter if the injection is made by mistake into the heart muscle, instead of into the ventricular cavity. The best drug to inject is **Adrenalin Hydrochloride** 1-1000.

1 c.c. in the adult. In children the dosage has been, for example, .2 c.c. in a newborn infant, .75 c.c. in a baby of six months. In a case of apparent death there must be no delay about the use of this method. Henschen recalls the physiological fact that between the apparent death of the heart (disappearance of pulse) and real death there is an interval of about ten minutes, sufficient, that is, to allow the medical man to use his resources for resuscitating the heart; after fifteen minutes success is much less likely, after twenty minutes failure is certain, since the vitality of the nerve centres is by that time irreparably damaged.⁹

Tornai's¹⁰ experiments may perhaps be remarked on. On twenty occasions he has made injections into the aorta in the case of impending death. The patient lies on his back, with his head turned to the right. A long filiform needle with an elbowed end is inserted in the suprasternal notch, parallel to the sternum and to the trachea, a trifle inclined towards the latter. When the aorta is reached, its pulsations are clearly felt; then the needle is driven $\frac{1}{2}$ cm. further, and the lumen is entered. This procedure is not without danger, in particular to the left subclavian and the inferior thyroid veins. Moreover, if the circulation is still in being, the intravenous injection achieves the same purpose without risk, and if the circulation is stopped, injections into the aorta are useless.

Results.—In three patients operated on by Henschen, apparently dead in spite of artificial respiration, subcutaneous injections, and massage to the heart, the cardiac beat reappeared immediately after injections into the heart of 1 mgrm. of adrenalin, death supervening after a quarter of an hour, three-quarters of an hour, and thirty-six hours, while in his fourth case the patient returned to life and had no recollection of the incident. Biedelung's case was that of a baby who, after chloroform, showed gradual arrest of heart and respiration in spite of hypodermic injections and artificial respiration. Intracardiac injection was almost instantaneously followed by return of the heart-beat and breathing. In Baumann's first case, a child of six months collapsed after chloroform, and was resuscitated by intracardiac injection of .75 mgrm. adrenalin, given four minutes after the heart had stopped; but this passed into a pulse-rate of 140, followed by convulsions and hyperpyrexia. His second case was one of respiratory and cardiac arrest complicating whooping-cough, the injection of 1 c.c. of adrenalin reviving both.

In 1921 Vogt¹¹ was able to collect from the literature fifteen good results.

REFERENCES.—¹*Wien. klin. Woch.* 1905, May 18; ²*Presse Méd.* 1921, Oct. 22; ³*Bull. de l'Acad. de Méd.* 1923, June 26; ⁴*Schweiz. med. Woch.* 1920, April 1; ⁵*Ibid.* 1923, Feb. 23; ⁶*Deut. med. Woch.* 1921, July 28; ⁷*Lancet*, 1923, March 10; ⁸*Münch. med. Woch.* 1922, Jan. 27; ⁹*Mocquot, Rev. de Chir.* 1909, April-June; ¹⁰*Med. Klin.* 1923, May 27; ¹¹*Münch. med. Woch.* 1921, June 17.

INTRATRACHEAL MEDICATION.

W. H. Wynn, M.D., F.R.C.P.

Intratracheal medication by the injection of olive oil or liquid paraffin containing such drugs as guaiacol, camphor, menthol, bismuth, iodoform, etc., has been advocated by many authorities both for therapeutic and diagnostic purposes. In view of this advocacy, Corper and Freed¹ have conducted experiments on animals with a view of discovering the effect on the pulmonary tissue of the introduction of these foreign substances. They found that chaulmoogra oil and the mixed esters of chaulmoogra oil injected intratracheally into rabbits produced distinct pathological changes in the lungs, ranging from an acute pneumonic consolidation with abscess formation, to a proliferative bronchopneumonia, depending on the concentration and localization of these oils in the lungs. A concentration as low as 10 per cent in olive oil or liquid paraffin still produced a proliferative bronchopneumonia. Olive oil and liquid paraffin

injected intratracheally in small amounts, not exceeding 1 c.c., were readily aspirated into the alveoli, and were retained for months and produced a mild type of proliferative bronchopneumonia. They consider that their experiments verify previous observations that great care is necessary in the introduction of any foreign substance into the lungs normally, and especially in pulmonary diseases. They regard it as questionable whether even local application through a bronchoscope can insure that the foreign substance may not leave the focus of intended localization to exert a deleterious action on normal lung tissue some distance away.

REFERENCE.—*Jour. Amer. Med. Assoc.* 1922, Nov. 18, 1739.

JAUNDICE. (See ICTERUS NEONATORUM.)

JAUNDICE, INFECTIVE.

J. D. Rolleston, M.D.

EPIDEMIOLOGY.—R. Inada,¹ of Tokyo, who in 1915 introduced the term 'spirochaetosis icterohæmorrhagica', which has to a large extent taken the place of 'Weil's disease', states that the total number of cases in Japan during 1915, according to official reports, was from 2000 to 3000, and estimates that in 1917 it amounted to 6000. This rapid increase is partly accounted for by a better knowledge of the disease, but there is no doubt that a real increase in the number of cases has taken place throughout the country.

P. Manson-Bahr² records the first authentic case—i.e., proved by animal inoculation—of infective jaundice yet reported in England. The patient was a seaman who developed the disease five days after immersion in Thames water. No history of contact with possibly infected rats could be obtained, whereas examples of infection arising from immersion in contaminated water have been recorded on many occasions—e.g., in the series observed by Sisto on the Isonzo in 1916–17, and by Reiter, who attributed certain cases in the German army to bathing in pools at Magdeburg and Brunswick.

V. Vanni³ has also recently reported a case in a man, age 51, in whom the infection was due to swallowing water as the result of falling into a stream while drunk. The disease in this case ran a very rapid course, proving fatal in fourteen days.

A sporadic case of spirochaetosis icterohæmorrhagica of undoubtedly local origin is reported at Ancona in a man, age 24, by L. Selandari,⁴ who remarks that the disease is not common in Italy.

D. H. Witt⁵ describes an epidemic of 11 cases of jaundice which occurred during the latter part of 1920 at the Bellevue Hospital, New York. The cases were similar to a group of 16 which occurred at the same hospital in 1919, and resembled Weil's disease in their symptoms, physical findings, and prognosis. Repeated attempts, however, to find the causative agent were unsuccessful, endeavours to isolate *Spirochaeta icterohæmorrhagiæ* in particular, failing. Witt concludes that the disease was some type of infection or toxæmia of unknown nature.

A similar but much more extensive epidemic of unknown cause is described by H. Williams,⁶ Sanitary Supervisor of the State Department, Albany, N.Y., who states that during the winter of 1921–22 New York State was visited over a wide area by epidemic jaundice. There were 1400 cases, with 5 deaths, 2 of which were in infants born to mothers ill with jaundice at the time of delivery, 1 in a girl of 5, 1 in a girl of 6, and 1 in a boy of 14. Of 700 cases specially studied, the sex distribution was almost equal, 50·4 per cent being males. A little more than half (51·7 per cent) were in the school age group from 5 to 14. In more than half the cases the dates of onset were during November and December, 1921. Multiple cases in a house or school were

very numerous, amounting to 421 cases—60 per cent. In no instance could the *Spirochaeta icterohæmorrhagica* or any other organism of significance be isolated, and there was no evidence that rat-borne or other contamination of human food supplies was of etiological importance. Williams thinks that the epidemic was spread by droplet or contact infection from person to person, and that the etiological agent was some unrecognized organism or virus carried in the nasopharyngeal secretions of persons ill of the disease, according to the view maintained by Herrman (*see* MEDICAL ANNUAL, 1919, p. 213).

MORBID ANATOMY.—After alluding to the principal features of spirochaetosis icterohæmorrhagica described by earlier writers—viz., generalized jaundice, numerous small hæmorrhages, severe renal disease, and degeneration of the skeletal muscles, R. Kaneko⁷ emphasizes the diagnostic importance of the following pathological features, in a monograph based on the study of 42 cases: (1) Engorgement of the bile capillaries without mechanical obstruction in the large bile-ducts; (2) Inflammatory and degenerative changes in the heart muscle and in the nerve-cells and fibres; (3) Certain negative findings, such as the absence of splenic enlargement, fatty degeneration, and extensive necrosis, and suppuration apart from mixed or secondary infections, which occurred in 7—16·7 per cent—of Kaneko's cases.

SYMPTOMS AND COMPLICATIONS.—S. Bosson,⁸ who remarks that signs of biliary intoxication are absent as a rule in spirochaetosis icterohæmorrhagica, reports a case which was remarkable for the presence of *bradycardia* and *pruritus*. He points out that spirochaetosis icterohæmorrhagica is characterized by the production of a larger amount of urea than any other infectious disease. The urea is produced not only by disintegration of the albuminoid substances in the system, especially the muscles, affection of which is shown by myalgia and muscular wasting, but also at the expense of the blood, as shown by the constant anæmia and the high urea content of the organs in which destruction of the red cells takes place.

A. Lemierre and J. Levesque⁹ report the case of a man, age 50, who in convalescence from spirochaetosis icterohæmorrhagica eliminated bile salts in the urine for nearly a month, as shown by Hay's test, without simultaneous elimination of true or modified bile pigments. He also suffered from persistent pruritus, which is generally attributed to the retention of bile salts. Examination of the blood serum when Hay's reaction in the urine was very distinct showed a normal pigmentary cholaemia.

E. Apert and R. Broca¹⁰ record two cases of *meningitis* in boys, age 13 and 14, which at first appeared to be tuberculous, especially as the fluid obtained by lumbar puncture showed large numbers of lymphocytes. Both recovered, however, and while the nature of the disease in the younger child was doubtful, the serum of the older boy protected guinea-pigs against infection with *Spirochaeta icterohæmorrhagica*. The writers conclude that this was a meningeal form of spirochaetosis icterohæmorrhagica, and refer to similar cases reported by Costa and Troisier, who had shown that spirochaetosis icterohæmorrhagica might be manifested solely by a meningeal syndrome without any icterus or hæmorrhages.

DIAGNOSIS.—In their report of the first case of spirochaetosis icterohæmorrhagica which has occurred in the Montpellier region, Ducamp, Carrieu, and Guet¹¹ emphasize the importance of the serum test (*see* MEDICAL ANNUAL, 1919, p. 214), as the search for the spirochæte in the cerebrospinal fluid, and inoculation of guinea-pigs with the patient's blood and urine collected aseptically, were negative, and only the serum test was positive.

PROGNOSIS.—A relatively large number of the 42 fatal cases described by Kaneko⁷ occurred in elderly persons, in accordance with the fact that the

prognosis of spirochaetosis icterohæmorrhagica is worse in old age than in early life. If the disease be divided as suggested by Inada and Ido into three stages, the distribution of the deaths in Kaneko's cases was as follows: (1) Febrile stage, up to end of first week—5 deaths, or 12 per cent; (2) Stage of jaundice or second week—24 deaths, or 57 per cent; (3) Convalescence—13 deaths, or 31 per cent. The largest number of cases—33 patients—79 per cent—died between the eighth and eighteenth days.

Further evidence of the aggravation of the prognosis of the disease in advanced life is furnished by Inada,¹ who states that the death-rate of severe cases under 40 treated with serum within six or seven days of the onset was 13 per cent, whereas above 40 the mortality of severe cases was 56 per cent. The mortality of all his cases over 40 was 50 per cent as compared with 6·5 per cent under 40.

PROPHYLAXIS.—Inada¹ considers the prophylaxis of spirochaetosis icterohæmorrhagica under the following four headings:—

1. *Active Immunization.*—Injection of a vaccine of *Spirochæta icterohæmorrhagica* prepared by Ito and Matsuzuki considerably reduced the incidence of the disease, as is shown by the fact that from July, 1919, to January, 1921, 10,268 men received prophylactic injections at the Tagawa mine, where 437 cases subsequently broke out, and of these all but 5 occurred among those who had not been injected.

2. *Treatment of the Soil.*—Ido found that the disease was most prevalent in localities where the soil was alkaline or neutral, and came to the conclusion that the spirochæte offered a very weak resistance to acid media. Toyama found that the spirochæte grew well in fertilizers made of fishes, plants, or ashes, but was killed in 0·01 per cent of a lime-nitrogen fertilizer in a test-tube. He also found that the spirochæte lives in the upper layers of the soil and not in the deeper layers, and that the fertilizer passed down to the deeper layers sooner than the organism and had power to destroy it, after the soil had been treated with a lime fertilizer. None of the 3389 men and women employed on the land contracted the disease, whereas prior to his experiment 52 men and 82 women had developed it.

3. *Destruction of Rats.*—This is a highly important prophylactic measure, as the disease is liable to occur in houses infested with rats.

4. *Drainage of Damp Mines.*—The disease rarely occurs in dry mines. After improvement of the drainage in a section of a mine in which nine persons had contracted the disease in twenty-four days, no further cases occurred.

TREATMENT.—Inada¹ states that the results of the Serum treatment introduced by Ido in 1917 have been that the death-rate has considerably diminished; e.g., at the Kyushu Medical Clinic it has fallen from 30·6 per cent to 17·3 per cent, and the mortality of the severe cases has dropped from 57·1 per cent to 34·7 per cent; 20 c.c. is a sufficient dose for mild or moderate cases, and in severe cases the dose is repeated.

REFERENCES.—¹Japan. Med. World, 1922, 189; ²Lancet, 1922, ii, 1056; ³Polichinico, 1922 (Sez. Prat.), 1038; ⁴Gaz. deg. Osped. 1922, 1289; ⁵Jour. Amer. Med. Assoc. 1922, ii, 1498; ⁶Ibid. 1923, i, 532; ⁷Ueber die path. Anat. der Sp. ict. 1922; ⁸Thèse de Paris, 1922, No. 457; ⁹Bull. et Mém. Soc. méd. Hôp. de Paris, 1923, 5; ¹⁰Presse méd. 1922, 1093; ¹¹Bull. de l'Acad. de Méd. 1922, i, 427.

JAWS, CANCER OF.

Sir W. I. de C. Wheeler, F.R.C.S.I.

Ochsner,¹ referring to the treatment of cancer of the jaws, states that:—

1. So much progress has been made in the use of X rays and radium that the next few years may develop marked changes in the treatment of these cases.

2. At the present time the destruction of these growths with the actual

cautery, or with one of the methods of applying diathermy, seems to give better chances of a permanent cure than excision with the knife.

3. All of the cases in the series he gives were operated in the inverted Trendelenburg position with the head of the table raised to an angle of 45°.

4. They were under very complete morphine-atropine-ether anaesthesia administered with the patient in the horizontal position, but no ether was administered after the operation was begun or after the head of the table had been elevated.

5. The cerebral anaemia caused by the position seemed to suffice to carry the patient through the operation without the necessity of administering any further anaesthetic. There were no ether pneumonias.

6. In these cases his observation in a previous series was again confirmed that cases that have a recurrence following an incomplete operation have but a very slight chance for a permanent recovery. This shows the importance of making a very thorough operation at the time when such tumours are first noticed.

7. His observation has convinced him that early and very extensive operation with the cautery, followed by carefully planned after-treatment with X rays or radium, is quite worth while in these cases, and that occasionally even advanced cases will be permanently cured by this method.

REFERENCE.—*Ann. of Surg.* 1922, Sept., 398.

JOINTS, TUBERCULOSIS OF. (See BONE AND JOINT SURGERY.)

KALA-AZAR. (See LEISHMANIASIS.)

KELOID.

E. Graham Little, M.D., F.R.C.P.

Daland¹ reports his experience in the treatment of keloid with Radium in 58 cases—36 females, 22 males. Keloids may occur at any age, but are less common after fifty. Of these 58 cases, 11 are stated to have been spontaneous—that is, no defined cause was ascertained; operative scars and burns formed by far the largest groups. Five had received numerous X-ray treatments without improvement. One patient had been treated with radium without benefit. There would appear to be some tendency to hereditary transmission of keloids, family histories being common. Radiation was administered in 54 out of the 58 cases. Rays filtered through silver and unfiltered were given in different cases. The unfiltered method is quicker, but leaves more unsightly atrophy. Silver filtration should therefore be used in keloids of recent origin, in children, and in people of dark complexion in whom a white scar is disfiguring, and in exposed areas of the face. The dose should be from 30 to 60 mgrm. hours according to the age of the patient. Unfiltered rays may be used in all other kinds of keloid, but it should be explained that ulceration will result from this type of treatment, and a white scar. For unfiltered rays, half the dose given above should be used.

REFERENCE.—*Surg. Gynecol. and Obst.* 1923, Jan., 63.

KIDNEY, DISEASES OF

Sir John Thomson-Walker, F.R.C.S.

In a paper on the choice of methods employed in the surgical diagnosis of renal disease, Wade¹ states that in the investigation of the cause of suspected renal hæmorrhage which cannot be carried out at the time when bleeding is taking place, ureteral catheterization does not render as much assistance as many suppose. The vascular mucosa of the ureter and renal pelvis bleeds readily even with the gentle introduction of a soft catheter. Blood often appears ten minutes or so after the catheter has been inserted owing to the

irritation of its presence. If, however, urine tinged with blood appears immediately after the careful introduction of the catheter into the renal pelvis, it can safely be assumed that the hæmorrhage is due to a pathological lesion. If the introduction is followed by the sudden escape of bright blood, which soon stops owing to clotting, the most likely explanation is the presence of a vascular tumour invading the renal pelvis. For the diagnosis of doubtful shadows in the course of the ureter, he prefers the opaque ureteric catheter to the wax-tipped bougie. He finds chromocystoscopy, after the intramuscular injection of 4 c.c. of a saturated solution of indigo-carmin, to be the simplest and safest method of determining whether one or both kidneys are functioning; but as a means of estimating diminished functional activity in one organ, it is not of so great value as other methods.

MacGowan² reports a case of *unilateral painful hæmaturia* in which the kidney was removed. The lesions found were very similar to those reported as renal papillary varix, following chronic inflammation of the pyramids.

Hunner³ states that ureteral stricture probably plays an important part in the causation of many obscure hæmaturias. It has been shown that slow compression of the ureter often results in dilatation of the tract above, with more or less damage to the kidney substance, and secondary renal ptosis; but the author has evidence that stricture, instead of causing dilatation of the tract above, may lead to shrinkage, either because of increased irritability or because of actual shrinkage of the kidney as a result of nephritis. Ureteral stricture is usually caused by inflammation secondary to some distant focus of infection, and the author finds that in many cases the pain and hæmaturia, which he ascribes to secondary renal changes, cease promptly after dilatation of the stricture, and that, if they recur, investigation shows that the stricture has again contracted. In some cases, however, the bleeding continues in spite of dilatation of the stricture, and in such, only after finding and removing an active focus of infection, e.g., septic tonsils, has a permanent cure resulted. Ureteral stricture was present in 18 of his cases of so-called 'essential' hæmaturia. Strictures of the ureter, even with unilateral symptoms, are more often bilateral than unilateral, and the colic and bleeding in these cases are due to hindrance to the outflow of urine. Out of 100 consecutive cases he found that 71 complained of pain in the bladder and urethra, and in 33 the bladder disturbances were marked and more or less constant. In some cases no lesion other than stricture was found to account for these symptoms; but in others he found associated cystitis, trigonitis, or urethritis.

Stevens,⁴ discussing *hæmaturias of obscure origin*, considers that the terms 'idiopathic' or 'essential' should be limited to those cases with negative post-mortem findings. In many cases of obscure hæmaturia, there may never be enough blood in the urine to permit of localization of its origin. Blood in the urine has been reported many times as the result of physical exercise and fatigue in athletes and, with cold as an added factor, in soldiers. One must remember the liability of exercise to initiate bleeding in cases of renal calculus. Acute fevers, cardiovascular disease, purpuric conditions (including scurvy), syphilis, nephritis, and the use of certain drugs (hexamine, phenol, barbitol, etc.) must be borne in mind as causes of transient or intermittent hæmaturia. Varices of the bladder, hydronephrosis especially with mobile kidney, polycystic kidneys, and such extra-urinary conditions as appendicitis, giving rise to hæmaturia, may be diagnosed with reasonable certainty on routine examination; but conditions of the renal pelvis such as varicosities and angiomas require exploratory operation. Cases of chronic nephritis may be associated with hæmaturia, which is occasionally unilateral. The author considers that to explain certain obscure hæmaturias

by ascribing them to 'disturbed renal vasomotor system', or to 'angioneurotic' or to 'neuropathic' origin of hæmorrhage, as has been done by certain German and French writers, should be avoided, and that one should persist in a search for an anatomical diagnosis.

Fowler,³ referring to the significance of *pyuria in children*, says that whatever the underlying pathology, *B. coli*, with or without staphylo- or streptococcal infection, is the most common organism found in the urine; but so far as the diagnosis of the cause of chronic pyuria is concerned, even repeated pure culture of *B. coli* alone from the urine is no proof whatever that the case is one of *B. coli* infection only and unassociated with stone or tubercle. In chronic cases, at least, the absence of *B. coli* is of more value than its presence.

Fullerton,⁶ discussing the question of *pains of renal origin*, classifies such pains as those due to mechanical or traumatic causes, and those due to inflammatory conditions. The mechanical causes are distention of the ureter, pelvis, and calices, swelling of the renal parenchyma within its capsule owing to congestion or œdema of the kidney, contact of a foreign body with the walls of the pelvis or calices, dragging of the pedicle of the kidney, compression of nerves, and sclerosis of the kidney. The inflammatory causes are disease of the pelvis and calices, such as pyonephrosis; of the parenchyma, such as pyelonephritis; and of the perirenal cellular tissue, such as perinephritis and perinephritic abscess. This classification is based on the work of Papin and Ambard, who consider renal pain usually is due to distention of the renal pelvis, pain in the kidney itself being generally of moderate intensity except in inflammatory conditions, when it may become very severe.

In a paper on *reflex anuria*, Neuwirt,⁷ acting on the knowledge that the splanchnics are the vasomotor nerves of the kidney, applied the Kappis method of blocking the splanchnic nerves in a case of recurrent renal colic with reflex oliguria, probably induced by calculi, in a man of 54. The colic subsided, and the output of urine increased to an average of 63 ounces a day. He blocked the splanchnic nerves on both sides in this case, but thinks that possibly blocking one side only would have sufficed.

Subcutaneous traumatic rupture of the kidney is, according to Keller,⁸ found in less than 1 per cent of surgical cases. Out of 83,000 surgical cases seen at the Municipal Hospital, Copenhagen, during the past twenty-six years, only 43 cases of this condition were found. The rupture may be indirect, but direct rupture is more common, and is due to compression of the organ by the thoraco-abdominal wall. The degree and the extent of the lesions vary from superficial tears of capsule and cortex not involving the calices, to complete crushing of the kidney, which is generally associated with other severe injuries. Injury of the pedicle or the pelvis is not uncommonly associated. The most common complication is fracture of the 12th rib, while peritoneal rupture with discharge of blood and urine into the peritoneal cavity is not uncommonly associated. The mortality of non-complicated rupture varies from 15 per cent to 27 per cent. The two principal dangers are hæmorrhage and infection, responsible for 45 per cent and 4 per cent of the mortality respectively. Slight injuries should be treated conservatively, operation being reserved for those in immediate danger. In 478 conservatively treated cases, reported up to 1908, there were 60 deaths from hæmorrhage, 38 from infection, and 9 from other causes. With conservative treatment, the risks of hæmorrhage, infection, and other complications are greater than with operative treatment. The best time to operate is immediately after the cessation of the initial shock. Operation is strongly indicated when associated peritoneal injury is suspected. Nephrectomy is indicated in cases of pedicle lesions, extensive infection, contusions destroying all functional tissue, and lesions requiring

a quick operation. Conservative operation consists of packing, suturing, and drainage, or nephrotomy, according to circumstances. The author has collected 43 cases; in the 35 not operated upon there were 4 deaths.

On the basis of 33 cases, Oppel⁹ discusses *gangrene due to adrenal arteritis*, the etiological factor of which he claims to be an excessive function of the adrenals with chronic poisoning of the tissues. In support of this, his pupil Girgola¹⁰ was able to demonstrate, in the blood of patients suffering from this disease, an increased quantity of vasoconstricting substances. Oppel advocates the treatment of such cases by extirpation of one of the adrenals—for anatomical reasons preferably the left. This operation was performed in four cases with a remarkably small loss of blood. One patient died three days after operation, sclerosis of the coronary arteries being subsequently discovered. In the second patient gangrene developed, and the excision of the adrenal did not prevent the necessity for amputation of the lower extremities. In the other two cases, however, great improvement resulted. In every instance the blood-pressure fell after the operation.

METHODS OF EXAMINATION.

On the basis of 448 observations, in which specimens were taken from each kidney at the same time and as far as possible under the same conditions as regards the size and shape of the ureteral catheter and the distance along which it was passed into the ureter, Fullerton¹⁰ is of opinion that a *lowered specific gravity of the urine of one side* is an important sign of disease or functional disturbance of the kidney on that side. In 41 cases of unilateral renal calculus, 31 showed a diminished specific gravity on the affected side. In 2 cases it was a little higher on this side, and in the remaining 8 it was equal on the two sides. Of 41 cases of renal tuberculosis examined, 3 were bilateral and had an equal specific gravity on the two sides; 1 unilateral case had a low specific gravity, 1005, on both sides. In the remaining 37 cases the specific gravity was reduced on the affected side. Of 39 cases of unilateral pyelitis, 33 showed a diminished specific gravity on the affected side, and 1 on the sound side, whereas in the remainder the specific gravity was equal on the two sides. In 7 out of 9 cases of renal tumour, the specific gravity was lower on the affected side; and in addition there were 4 cases of renal involvement by extension of a neighbouring tumour in the abdomen, in 3 of which the specific gravity of urine was lowered on the affected side.

Two cases of congenital cystic kidney were examined; in 1 the specific gravity was 1005 on both sides, in the other the specific gravity of the specimen from the side on which a palpable tumour was present was 1005, as against 1010 on the opposite side where no tumour was palpable. In a case of hydatid cyst of the kidney, the specific gravity was under 1005 on the affected side, and 1015 on the sound side. Fifteen cases of hydronephrosis and 4 of pyonephrosis all showed diminished specific gravity on the affected side. Of 15 cases of movable kidney, 8 showed a lower and in 2 cases a higher specific gravity on the affected side, but the difference was not great as a rule. In 28 of 37 cases of renal hæmaturia, due to such diverse conditions as congenital hæmophilia, Henoch's purpura, bilateral nephritis, and essential hæmaturia, the specific gravity was equal on the two sides. In 'essential hæmaturia' the specific gravity is as a rule equal on the two sides. Of 19 cases of gunshot wounds of the kidney examined within three months of injury, the specific gravity was lower on the affected side in 9; in 1 the specific gravity was 1005 on the sound side as against 1015 on the injured side, whereas in the remaining 9 cases the specific gravity was equal on the two sides. The author concludes that one of the most important factors in deciding which kidney is the seat

of disease is the determination of a marked reduction in the specific gravity of the urine from the affected side.

Lowsley and Muller,¹¹ in an experimental study of the various chemicals used in *pyelography*, emphasize the value of placing the patient in a sitting posture and withdrawing the catheter as the pyelographic medium is injected, and then immediately taking an *x*-ray photograph, as by this means many lesions of the ureter are brought out which would not otherwise be demonstrated. They favour the use of a 20 per cent solution of sodium iodide as being the most graphic medium.

Osborne, Sutherland, Scholl, and Rowntree¹² suggest the taking of *x*-ray photographs of the urinary tract during the excretion of sodium iodide administered intravenously, after the preliminary administration of 15 gr. of potassium iodide by mouth, three times a day for two days, which is given in order to determine the presence or absence of any idiosyncrasy to the drug. One hundred and fifty gr. of chemically pure sodium iodide may be given to practically any patient without untoward symptoms, provided the injection is not too rapid, i.e., not completed in less than four or five minutes. With a dose of more than 150 gr. symptoms appear which are probably due to osmotic changes resulting from large amounts of the hypertonic solution. The usual contra-indications to iodides apply here: patients with tuberculosis, adenomatous thyroid, exophthalmic goitre, and marked debility are not good subjects for the administration of this drug. The authors have found that satisfactory *x*-ray photographs of the bladder were secured in practically every case with doses of from 75 to 300 gr. of sodium iodide intravenously; 150-gr. doses intravenously gave fair *x*-ray photographs of the kidneys and ureters in approximately 50 per cent of the cases, and occasionally of the liver and spleen. The best photographs of the upper urinary tract and of the spleen and liver were secured by the use of large doses, i.e., 225 to 300 gr. The photographs should be taken half an hour, one hour, and two or three hours after doses of 75, 150, and 300 gr. respectively. More or less similar results were obtained after the administration of sodium iodide by mouth in repeated doses. They claim that this is a satisfactory method of showing the presence and approximate amount of residual urine in the bladder, thus eliminating the necessity for catheterization.

Sears¹³ describes a *new method of making ureteropyelograms*. A wax spindle about 2.5 mm. to 3 mm. in diameter is placed on the whistle-tip ureteral catheter about 1 cm. to 1.5 cm. from the tip. The catheter with the bulb is passed into the ureter so that the bladder wall holds the bulb. The patient's shoulders are elevated slightly, and an X-ray plate is placed under the back, inclining at an angle of about 10° to 15°. The ureter and renal pelvis are then gently filled. If the patient is flat on his back, the upper ureter does not fill, possibly owing to the fact that the fluid, after crossing the iliac crest, flows rapidly to the pelvis of the kidney, and, producing the pain of distention, further injection is prevented. The Trendelenburg position allows the kidney to fall upwards and thus disturbs its usual position, so that true information is not obtained.

Thompson¹⁴ advocates the *injection of oxygen* instead of a liquid opaque medium for pyelography. The use of air was advocated by Cole in 1910. The shadow of a stone will not be obscured by the presence of oxygen in the renal pelvis. The 'black' of the oxygen against the lighter shadow of the renal substance makes a better contrast for the study of the kidney tissue itself. Oxygen is not toxic or irritating, and, being more permeable than any of the opaque solutions, passes obstructions or constrictions more readily. The author considers the following groups of cases are best investigated by this method: stone in the ureter, pelvis, or calices, hydronephrosis, pyone-

phrosis, ureteral strictures or obstructions not readily passed by opaque solutions, malformed and misplaced kidney. After this procedure there is little if any reaction, its carrying out involves less discomfort, and, finally, the author thinks that it is of greater value in X-ray diagnosis than the use of opaque solutions.

The value of the perirenal insufflation of oxygen as a diagnostic measure is fully appreciated by Quinby,¹⁵ but his experience has shown that in the usual case the presence of gas about the kidney does not give plates of any greater value. In the occasional case, however, when the patient is large and fat, or in those instances in which the ureter is blocked by stone, or when for any other reason it is found impossible to inject the kidney pelvis at all, a knowledge of the kidney outline, made possible by the injection of gas, is often of distinct value.

Marion¹⁶ contrasts the *estimation of renal function* of the kidneys, prior to nephrectomy, by means of ureteral catheterization, and careful examination, microscopical, bacteriological, and chemical, of the two urines, with the estimation of renal function for the same purpose by means of Ambard's constant. He concludes that if ureteral catheterization by the ordinary route is impossible—which is very rare—yet there exist a much greater number of cases in which it is impossible to determine Ambard's constant owing to the conditions found in the patient, and that the determination of this constant, an exceedingly delicate thing, entails a great risk of error when estimated in laboratories which have not had much experience of it.

ABNORMALITIES OF THE KIDNEY AND URETER.

Judd, Braasch, and Scholl,¹⁷ discussing *horseshoe kidney*, state that a horseshoe kidney is relatively vulnerable to disease and trauma, as shown by the relation between its occurrence and the frequency with which it requires surgical interference. Out of 68,000 autopsies, Carlier and Gerard found 80 horseshoe kidneys, whereas out of 2424 operations performed on the kidney at the Mayo Clinic from January, 1910, to January, 1920, 17 were on horseshoe kidneys. The accessibility of these kidneys varies indirectly with the degree of fusion: the more complete the fusion, the lower is the position of the kidney. In the usual type, fusion occurs at the lower poles, and not infrequently the superior poles are widely separated. Complete rotation of the kidney on its vertical axis is prevented by the fusion, thus leaving the pelvis facing anteriorly. The pelvis is generally very irregular in size and shape, usually completely extrarenal. Duplication of the pelvis is common. High implantation of the ureter, and the sharp uretero-pelvic angle preventing free drainage, are the most common causes of disease in these kidneys. The ureters generally pass in front of the isthmus and are thus easily compressed or distorted by the overlying structures. They usually enter the bladder normally. The renal vessels are oblique and irregular in their length and distribution. The inferior mesenteric artery usually passes over the isthmus. Thrombosis of the iliac vein has been recorded from pressure of the isthmus on the great vessels. Clinical diagnosis is very difficult, and this abnormality is seldom recognized on abdominal palpation. A stone shadow more median than is usual may be suggestive, especially if the shadow lies obliquely and extends towards the mid-line; but here shadows cast by calcified paravertebral glands, low or median-lying gall-stones, and stone in the upper ureter may give rise to error. On cystoscopy, the ureteric orifices are usually normally situated.

While the passage of opaque catheters may be of considerable diagnostic value, yet it often happens that the two pelves are approximately normal in position, and hence pyelography becomes of great value. Instead of lateral

extension of the calices, there is torsion of the renal pelvis, so that the calices extend in a median or cephalic direction. Heminephrectomy is usually possible if the distance separating the two pelves is sufficient, and if the function of the opposite segment is satisfactory, and they find the most satisfactory exposure to be obtained through the Mayo lateral incision.

Krytschak¹⁸ states that *duplication of the renal pelvis and ureter* is a not infrequent cause of hydro- or pyo-nephrosis. If both ureteral openings in a case of complete duplication of the ureter can be recognized on the affected side on cystoscopy, the diagnosis is easy; but if one ureteral opening is obscured by inflammatory swelling of the bladder mucosa, diagnosis must be made by cysto-radiography, i.e., screening of the bladder filled with a contrast solution; for with stasis in the renal pelvis and ureter, closure of the diseased ureter is, he thinks, frequently insufficient, and the urine therefore flows backwards. Incomplete duplication of the ureter is difficult of diagnosis, but pyelography may help. Diagnosis of duplication of the renal pelvis should, if possible, be made prior to operation, so that ligation of vessels supplying a normal portion of the kidney can be avoided. In 87 per cent of cases operated upon for this condition, only one-half of the kidney was abnormal, and in 80 per cent of these the abnormality was in the upper portion. Resection of the abnormal half was performed in 17 cases, and nephrectomy in the remainder. The author estimates the frequency of these malformations to be from 3 to 4 per cent.

Braasch and Scholl¹⁹ discuss the pathological complications which may be associated with the duplication of the renal pelvis and ureter. In 300 cases collected by Mertz, 27 per cent showed bilateral duplication, while out of 144 cases seen in the Mayo Clinic from 1907 to 1922, 94 per cent were unilateral (incomplete 69 per cent, complete 25 per cent), and 6 per cent bilateral (incomplete 0.7 per cent, complete 5.5 per cent). In the complete unilateral duplication there was an ectopic ending of the duplicated ureter in 3 cases. Duplication of the pelvis may be said to be complete only when the several pelves have separate ureters. The kidney with the duplicated pelvis is usually normal in its position and in its relation to the surrounding structures, but is usually larger than normal, and the two renal segments are as a rule separated externally by a depression which varies from a shallow notch to a deep, broad groove. The differential function of one segment is usually equal to that of the other. Occasionally the ureteral divisions leading from the duplicated pelves in incomplete cases unite close to or even within the kidney. With completely duplicated ureters, crossing often occurs just above the bladder and also below the uretero-pelvic junction, but there may be only one crossing or even none at all. Rarely the ureters are in close apposition and may be enclosed partially or entirely in a common sheath, rendering it very difficult to preserve the sound ureter during a partial resection of a diseased segment with its attached ureter. Ectopic ending of an aberrant ureter may occur into the vagina, urethra, seminal vesicles, or ejaculatory ducts. A pathological complication in one or both segments with consequent deformity may render diagnosis exceedingly difficult. The use of indigo-carmin is of great help, especially in the case of ectopic ureters, in which condition incontinence is the rule, so that every case of incontinence, not otherwise explained, should suggest the possibility of this condition. The relation of the two pelves as outlined by a pyelogram is of value in determining the distance separating them, the presence or absence of direct communication, and their relative size. The smaller pelvis is usually cephalic, and its calices are smaller than normal. In their series, 54 cases were found to be suffering from definite pathological complications; of these, 30 were operated upon

—nephrectomy in 15 cases, heminephrectomy in 4, pyelotomy in 6, ureterolithotomy in 3, division of anomalous vessels in one, and ligation of an aberrant ureter opening into the vagina in one case. Infection, especially chronic, may be mainly confined to the primary segment; but usually it would invade the other segment to such an extent that nephrectomy is advisable. Heminephrectomy is permissible only in certain cases of lithiasis, early localized infection other than tuberculosis, or small hydronephrosis confined to one segment.

Müller²⁰ describes the diagnosis and removal in two cases of a diseased *supernumerary kidney*, and discusses the literature of this condition. He emphasizes the danger of overlooking such an anomaly, and the importance of bearing it in mind in dealing with all vague abdominal disturbances. Pyelography is the most useful diagnostic aid. Twenty instances of resection of the diseased half of a double kidney are also recorded. Eggers²¹ considers that in pathological conditions affecting horseshoe kidneys, the course of the ureters should be determined, and, unless a serious lesion necessitates the extirpation of one-half of the kidney, the division of the isthmus should be followed by nephropexy.

Eisendrath²² draws a distinction between the true double kidney in which there is reduplication of the renal pelvis on one or both sides in association with a similar condition of the ureter on one or both sides, and the so-called double kidney, the crossed ectopic kidney, arising as the result of a congenital misplacement of one kidney to the opposite side, with fusion of it to the lower pole of the kidney of that side. By supernumerary kidney is meant a third complete kidney not connected with the normally placed and developed organ of either side; very few recorded cases of this anomaly bear close scrutiny, because some at least are really instances of true double kidney with complete separation of the two halves. There is no recorded case of reduplication of the ureters, with the union at some higher point so as to end in a single pelvis, so that double kidney is probably always associated with double ureter. Clinically, the author finds no essential difference between the various pathological conditions found in double kidney and those met with in single kidney. In 80 clinical cases, the incidence of the different diseases for which operation was performed was about the same as one expects to find in a single kidney, and in 32 of these a pre-operative diagnosis of double kidney was made, in 23 by the aid of pyelography and opaque catheters, in 7 by the observation of two ureteral orifices on one or both sides of the bladder, and finally in 2 cases by noting that clear and turbid urine was obtained alternately from the ureteral catheter. In cases calling for heminephrectomy, before deciding on this operation the pedicle should be exposed to determine if there is sufficient blood-supply for the remaining half, which exposure may be very difficult.

Stewart and Lodge²³ describe the congenital renal abnormalities found in a consecutive series of 6500 autopsies, at which 14 cases of horseshoe kidney, 1 of unilateral fused kidney, 16 of congenital absence of one kidney, and 3 of pelvic kidney were found. The unilateral fused kidney was of the crossed ectopic variety, and the ureteric orifices were normally situated in the bladder. Fourteen cases of this condition, including the above case, have been collected by the authors from the literature. Cystoscopy or even ureteral catheterization would apparently reveal a normally functioning kidney on the side away from the lesion, and the diagnosis of congenital abnormality may only be made at a late stage of the nephrectomy. It is in such a case that preliminary X-ray examination after the passage of opaque bougies, or preferably the injection of a pyelographic medium, would be of the greatest assistance.

HYDRONEPHROSIS AND RENAL STASIS.

Crabtree,²⁴ writing on the *nature and significance of renal stasis*, thinks that the consideration of this condition from the physiological rather than from the pathological point of view should give knowledge which would influence treatment. He recognizes four types of renal stasis as existing between the condition obtaining in the normal kidney and that in the large hydronephrosis: (1) Acute stasis; (2) Subacute stasis; (3) Intermittent stasis; and (4) Relative stasis, a term applied to the occasional case of reno-ureteral dilatation occurring without obvious cause. The author regards 10 c.c. as being the average capacity of a normal pelvis, but more than 2 to 3 c.c. of urine are seldom found in the pelvis of the normally-secreting kidney. Over-distention of the normal pelvis to the point of producing pain is followed by increased peristalsis of the pelvis and ureter, whereas, in the larger hydronephrotic pelvis, over-distention is either painless or produces merely a dull ache. Acute stasis is most commonly due to stone, but is also seen in accidental ligation of ureters, obstruction by blood-clot, and to some extent during acute pyelonephritis. Sudden and complete obstruction paralyses the secreting power of the kidney before sufficient time has elapsed to allow of pelvic dilatation, and even four or five days after obstruction a small tense pelvis, a stony-hard kidney, and a tense dilated ureter extending to the point of obstruction are found. On incising the pelvis there is a violent gush of urine, and almost immediately secretion is re-established with a subsequent polyuria, lasting from twenty-four to forty-eight hours. Subacute stasis occurs in cases of partial obstruction with back pressure and renal dilatation of weeks' or months' duration, such as may be associated with pregnancy, ureteral stone, and prostatic obstruction. In such, the pelvic capacity may vary from 30 to 480 c.c. where symptoms have only been present a few months. Though pelvic dilatation may be extreme, it has not existed long enough to produce thinning of the cortex; however, in marked over-distention, e.g., 200 to 300 c.c., he finds some degree of permanent pelvic damage to be constant, especially in the presence of infection. Renal mobility and the presence of aberrant arteries are causes of intermittent stasis. Most cases of movable kidney with Dietl's crises where polyuria follows the cessation of the attack, show a pelvis little if at all dilated on pyelography.

The pathology, symptoms, diagnosis, and treatment of hydronephrosis due to aberrant renal vessels is discussed by Petren,²⁵ Quinby,²⁶ and Rowlands.²⁷

INFECTIONS OF THE KIDNEY.

Twenty-eight cases of *atrophic pyelonephritis* are reported by Braasch.²⁸ The author states that this condition is distinguishable from chronic bilateral pyelonephritis both clinically and pathologically. The urinary symptoms are less severe and are usually not progressive. Pain is the most common symptom; it is unilateral and more severe, and is often accompanied by evidence of acute renal infection. It may occur as short periods of dull unilateral ache or in acute attacks. Frequent and difficult micturition are common, and hæmaturia occasionally occurs. In some cases there may be rigors and fever. A moderate amount of pus is, as a rule, found in the urine. Cystoscopy shows, in most cases, the effluxes diminished on the affected side and increased on the healthy side. The urine from the affected side may be slightly turbid. Diminution of the phenolsulphonethalein from the affected side in the presence of little evidence of infection, and an increase in the output from the opposite kidney, are almost pathognomonic of atrophic pyelonephritis. Braasch considers the condition to be due probably to septic infarction and

not to be the end-result of the usual pyelonephritis. Possible foci of infection in the teeth and tonsils are usually present in these cases.

Wulff²⁹ summarizes the literature dealing with the Vaccine treatment of urinary infections, and gives his experiences with 108 cases, 20 male and 88 female, including 8 patients under fifteen years of age, seen in Rovsing's clinic, during the past ten years. In 92 cases *B. coli*, and in 8 the staphylococcus, were present in pure culture. He found a spontaneous cure of infection of the urinary tract to be of extremely rare occurrence, for while the acute symptoms may subside, infection persists in a chronic form. The consensus of opinion seems to be that about 20 per cent of patients are refractory to this treatment. Vaccine treatment as a preliminary to operations on infected urinary passages would appear to be promising, but this has not, as yet, been tried on a large scale.

Dallenger and Elder³⁰ find on investigation that definite germicidal emanations are given off from Colloids of Silver Salts which prevent the growth of bacteria on Petrie agar plates in the immediate area surrounding the sealed glass tubes containing the colloidal silver chloride. A 1 per cent solution of this salt has a germicidal value about equal to carbolic acid; yet when sealed in the anterior urethra it gives rise to no pain, and this is the case with even stronger preparations. No irritation is produced by its application to mucous membranes of bladder, nose, throat, sinuses, etc. Spermatozoa will live in a 1 per cent preparation for twenty minutes or more, and, these being highly organized and delicate cells, the relative harmlessness to the body tissues of silver chloride is thus shown, whereas a 5 per cent preparation of this salt diluted 4000 times killed the spirochaetes taken from a foul mouth in four minutes. Given intravenously to rabbits artificially infected with the *Staphylococcus aureus*, 1 c.c. of a 1 per cent preparation led to sterilization of their blood within twenty-four hours, while controls not so treated died within forty-eight to seventy-two hours with multiple abscesses of the liver, kidney, heart, and other organs.

Roe³¹ considers that the main factors concerned in the production of urinary infection are: (1) Absorption of bacteria into the blood from some focus elsewhere in the body, the commonest lesions being in the bowel, prostate, teeth, tonsil, and nasal cavities; (2) Obstruction to the urinary outflow for any reason; (3) Disturbances of metabolism connected with the production of a highly acid urine. The third factor is the most important. Under certain conditions, especially those bringing about fatigue, the acid products render the blood highly irritating to the kidney. This impairs the efficiency of the kidney and lowers its vitality, so that, when bacteria from some septic focus are present in the blood, conditions are favourable for renal infection to take place.

Cooke,³² in view of the doubtful benefits from the oral administration of Hexamethylenamine for urinary infections, and of the beneficial effects of the intravenous infusion of small doses of the drug which he observed in several cases of cholecystitis, was led to adopt the latter mode of administration in urinary infections in association with the local treatment directed to the removal of the focal infection. He has treated acute and chronic cystitis, pyelitis, prostatitis, and urethritis, also phosphaturia and vesiculitis, administering small doses, $\frac{1}{4}$ grm. at daily intervals in acute cases, and with intervals of two or three days in chronic cases. Ten or twelve injections were the average number required in the 75 patients treated by him in this manner. Large doses, he states, may be followed by hæmaturia, but with small doses no unpleasant after-effects were noted.

Simmons³³ investigated the literature and found only 24 proved cases of

gonococcal infection of the kidney, and considers that the only satisfactory method of diagnosing gonorrhoea of this organ consists in obtaining the organisms by culture or smear directly from it. Including the case which he reports, only 15 were proved to be of pure gonococcal origin; 16 occurred in males. The earliest symptoms referable to the kidney occurred ten days after the onset of acute urethritis, whereas the most remote case occurred nine years after infection, and the fact that most of these cases occurred weeks or months after the initial infection indicates that gonococcal infection may remain dormant for a long time, and later demonstrate itself in lesions distant from the original focus. In only 6 cases were both kidneys affected; the right kidney was affected in 12, and the left in 7. Infection of the pelvis alone was found in 12, and of both kidney and pelvis in 9. A general gonococcal bacteriæmia was found in 3 cases.

RENAL CALCULUS.

Keyser³¹ discusses the mechanism of the formation of urinary calculi, the constituents of which include uric acid, urates, calcium oxalate, calcium phosphate, calcium carbonate, ammonium magnesium phosphate, and less often cystin or xanthin, which are all insoluble in water even within the range of acidity or alkalinity found in the urine. The power of the urine in health to hold these constituents in solution is due to the presence of finely-divided particles of organic matter, the so-called protective colloids, which are supposed to include the urinary pigments, traces of nucleo-albumin, mucin, and albuminous material from effete cells cast off from the renal parenchyma. The reaction of the urine, and the body temperature, are also important factors in maintaining urinary solution. The author has studied the experimental production of calculi by the feeding of rabbits and dogs on diamido-oxalic acid, which was excreted as such in the urinary tract, but on being deposited from the urine it assumed an entirely different crystalline morphology from that of the synthetic product fed, in that the crystals had changed from a non-fusing to a coalescent variety. The process appeared to be affected by the urinary colloids, as the reaction of the urine did not interfere with it, and the crystals, when dissolved by heating in animal urine, were reprecipitated on cooling, morphologically changed to the coalescent type. These experiments suggested that stone-formation might be due to one of several factors: (1) Excretion of an excessive quantity of crystalline material beyond the power of the urinary colloids to maintain either solution or deposition of isolated, non-coalescent crystals; (2) A deficient amount of protective colloid in the urine; (3) Precipitation of normal colloids, or masking of their protective activity by bacterial exudates or by foreign colloidal matter excreted as the result of an abnormal metabolism.

In a paper on bone suppuration as a cause of renal calculus, Paul³⁵ reports 20 cases in which there was a very definite etiological relationship between an existing bone suppuration and the formation of renal calculi. About 90 per cent of these cases showed definite signs of infection in the urine from the affected kidney, which in Paul's opinion is presumptive evidence that infection is a definite contributing cause, if not the most important cause, of renal calculi, and he thinks that, if every case of nephrolithiasis could be investigated thoroughly, a history of a preceding systemic infection could be elicited.

In discussing the *pathology and treatment of renal calculi*, Sampson Handley³⁸ stated that he considered the origination of a stone in a cyst in the substance of the kidney, unconnected with a calix, not uncommon. Pyelotomy should be the routine first step in the operative examination of the kidney, and nephrolithotomy should be a last resort, in that it sometimes caused dangerous

bleeding and always resulted in permanent injury to the secreting substance of the organ. The latter was, however, the only possible procedure short of nephrectomy in some cases, such as those with a very large stone, or in those with a short pedicle and a deep loin. He considered that accurate closure of the pelvis after pyelotomy was desirable if it could be quickly and simply carried out, and to attain this, after delivery of the kidney, he incised the capsule for three inches on the posterior surface parallel to the convex margin. He then stripped the capsule in the direction of the pelvis until the hilum was reached. The pocket thus formed was enlarged by blunt dissection until the line of entrance of the pelvis to the kidney was exposed. The pelvis was then incised in the line of the long axis of the kidney, the interior was explored with forceps or, if necessary, the finger, and any stones were removed. The opening in the pelvis could then be rapidly and effectively sealed by three catgut stitches in the original incision in the capsule.

TUBERCULOSIS OF THE KIDNEY.

Hübner,³⁷ discussing the diagnosis of renal tuberculosis, bases the following views on an experience of 58 cases coming to operation, and 109 cases examined under polyclinic conditions. The value of demonstrating the tubercle bacillus by direct microscopic examination or by animal inoculation is, he believes, much overrated. The kidneys may transmit tubercle bacilli from some distant focus without there being tuberculous disease of the kidneys, and, on the other hand, even in definite cases of renal tuberculosis animal inoculation may prove negative. In his opinion, catheterization of the ureters is often superfluous; but palpation of the thickened ureters through the abdominal wall, rectum, or vagina may yield important information at an early stage. It is, however, secondary disease of the bladder which the author considers most helpful in detecting early disease of the kidney. In the majority of his cases he has been able to diagnose renal tuberculosis by cystoscopy without the aid of the microscope.

Ferria³⁸ discusses his experience of 126 cases of renal tuberculosis. These formed 47 per cent of all cases of renal suppuration seen by him. The disease was unilateral in 106, and 89 of these were operated upon. The few cases of clinical cure of renal tuberculosis were due to total occlusion of the ureter. The bladder was involved early in 80 per cent of the cases. Of the 89 nephrectomies, there were 6 deaths following operation, and 6 during the subsequent six months. Death from tuberculosis of the remaining kidney was very rare, occurring in only 2 instances, but death from chronic pulmonary tuberculosis, cachexia, and meningitis occurred in 7 cases operated on in a condition of advanced vesical tuberculosis, which emphasizes the importance of not waiting too long before adopting surgical measures. Once a diagnosis of urinary tuberculosis is made, it may be definitely affirmed that renal tuberculosis is present except in cases of prostatic tuberculosis in men, a condition easily recognizable, and in the very rare cases of tubercle of the uterine appendages in women spreading to the bladder. As soon as a diagnosis of renal tuberculosis is established, nephrectomy is clearly indicated if the state of the other kidney allows.

PERINEPHRIC ABSCESS.

In none of 5 cases of perinephric abscess seen by Franke³⁹ had the correct diagnosis been made by the medical attendant of the patient. The disease is usually secondary to some trifling septic focus, such as a boil, which has often healed and is therefore frequently overlooked. In most cases the onset of the

disease is sudden, with fever, rigors, and severe pain. There may be no local signs, and the symptoms may be those of obscure septicæmia or typhoid fever. The urine may be normal. Two important aids to diagnosis are (1) exploratory puncture, repeated if necessary, and (2) watching the movements of the diaphragm on the screen.

CYSTS AND TUMOURS OF THE KIDNEY.

Marion,⁴⁰ writing on *bilateral polycystic kidney*, states that as the capsule is too closely adherent in these cases for decapsulation, he peels off the surface of the kidney by cutting the protruding wall of the superficial cysts with scissors. Three cases were treated in this way with good results, in that the intense pain was completely relieved.

Crawford⁴¹ draws attention to the hereditary tendency observed in polycystic kidney. The condition is comparatively rare; in one series of 10,000 autopsies 16 were found, and in another series of 2429 autopsies 10 were found. In 198 collected cases, 116 were females and 82 males, and the majority of these manifested themselves between the ages of forty and sixty. In 226 cases the condition was bilateral in 185. The disease is nearly always bilateral, and cysts of the liver are not uncommonly associated. In the later stages, constitutional disturbances due to nephritis with dyspepsia and loss of weight, and not uncommonly secondary cardiac hypertrophy with arteriosclerosis, develop. Severe anæmia may intervene, with progressively failing health and death from uræmia. Tumour formation is present in one or both flanks. The urinary findings may be negative, but blood-cells and albumin are often present. The majority of cases die about the fourth decade. Nephrectomy is not indicated, though cysts have been opened and drained with temporary relief to the patient.

Payr,⁴² in a paper on polycystic degeneration of the kidneys, discusses treatment by *Ignipuncture*. With the galvanocautery he pierces the cysts separately, or makes a crucial incision with it in the cyst, or cuts out the presenting portion by running the cautery around it. He has applied this treatment in 5 of the 14 cases of congenital cystic kidney he has encountered. All were benefited, and all are in good condition except one patient who died of duodenal cancer. The decidedly favourable action of ignipuncture was confirmed at autopsy in this case.

In an analysis of 40 cases of *malignant tumour* of the kidney seen between 1897 and 1919 at the University of Helsingfors, Lindstroem⁴³ found 5 to be of the mixed variety, the origin of which he believes to be from the relatively highly differentiated cells of the metanephron. Of 6 renal sarcomata in this series, 3 occurred between the ages of one and a half and fifteen years, and 3 between fifty-five and sixty. Those developing in children differ from those of adults microscopically in the greater abundance of round and spindle cells, in the smaller amount of intracellular substance, and by their greater tendency to metastasis. There was one case of carcinoma of the renal pelvis of the squamous epitheliomatous type. Such tumours, he states, are characterized by their tendency to invade other organs and to form metastases in the other kidney and in the bladder. Of the cases, 28 were Grawitz tumours, and these the author classifies into (1) the papillary, (2) the solid papillary, (3) the cysto-papillary, and (4) the solid alveolar types. Lindstroem assumes that the cause of such tumours is to be found in embryonic malformations inhibiting the differentiation of the cells of the secreting renal epithelium. All cases were operated upon; of 8 children under fifteen, all died of recurrence within nine months. Only 25·8 per cent of the total number, and only 34·8 per cent of the adults, remained free from recurrence for three years.

Fuller⁴⁴ states that the clinical manifestations of malignant tumours of the adrenals are by no means pathognomonic. Even a palpable tumour is apt to be diagnosed as a perirenal abscess, a tumour of the kidney, or disease of the gall-bladder, spleen, or liver. Examination of the urine and pyelography are of help in diagnosis, and attacks of pain in the hypochondrium and lumbar region due to pressure on the 1st, 2nd, and 3rd lumbar nerves and their branches are of especial diagnostic importance. There seems to be no relation between Addison's disease and tumour of the adrenal. Benign tumours are the most common, and sarcoma is said to be much the most frequent primary malignant growth. In a series of 24 cases of malignant tumour surgically treated, collected from the literature up to 1904, the immediate mortality was 50 per cent, and only 6 survived from six months to six years. He reports a case of his own in which the microscopic diagnosis was large round-celled sarcoma.

Magoun and MacCarty⁴⁵ made a study of 7 *renal neoplasms* in young children, the eldest of whom was seven years and the youngest twenty months; 6 of the 7 cases were females, and the growth was on the right side in 5, and on the left in 2. Three died within a year of operation (nephrectomy), 2 are alive but not well one year after operation, 1 is quite well twelve months after, and 1 cannot be traced. The authors state that three views with regard to the pathogenesis of the malignant renal tumours of infancy have been maintained: that they are derived from (1) the Wolffian body, (2) the embryonic kidney, (3) from aberrant cells of the myotome or other similar structures (Wilms).

Kretschmer⁴⁶ reviews the literature of *echinococcus disease* of the kidney, and reports a case of his own. He finds the disease to be of two types: (1) That in which the kidney, as far as can be determined clinically, is the only organ involved—this type is very rare; (2) That in which the kidney infection is part of a general infection involving other organs. The statistics dealing with the frequency with which the kidney is involved in a general echinococcus infection vary between 0.02 per cent to 5.4 per cent. In the author's case a pre-operative diagnosis of tumour in the right kidney was made, based on the presence of pain in the right renal region; hæmaturia, first noticed a year before; slight loss of weight; a pyelogram showing a distorted renal pelvis; the appearance of small areas of calcification in the right renal area on the X-ray plate, interpreted as being due to calcification in a tumour; and, finally, the absence of signs of infection in the urinary tract on bacteriological investigation. The patient stated that he passed a small round body the size of a pea which was soft in consistency and had particles of gravel in it. Later he passed some shreds in the urine which were sectioned and proved to be a mass of necrotic tissue with nothing upon which a diagnosis of echinococcus could be based. A blood-count revealed an eosinophilia of 8 per cent. In the 17 cases collected from the literature, together with the author's case, there were 15 males and 3 females, and their ages varied from twenty to fifty-eight years. The echinococcus fixation test was positive in the 3 cases in which it was carried out. In only 2 cases had pyelography been employed, and in both there was some distortion of the pelvis and calices. As regards treatment, resection is the method of choice in suitable cases; but in the majority, nephrectomy is necessary, and in the 18 cases reported this was carried out 9 times, with 1 death, the remaining 8 recovering completely.

Thompson,⁴⁷ in a paper on the *clinical features of renal growth*, emphasizes the importance, during nephrectomy for malignant disease of the kidney, of removing the perinephric tissue as freely as possible and ligating and dividing the renal pedicle as near its origin as possible. He analyses 81 cases seen at Guy's Hospital between 1890 and 1910, and at the Victoria Hospital for Children between 1889 and 1912, together with two cases from his own practice.

In a paper on *papillary carcinoma of the kidney*, Stellwagen⁴⁸ considers that practically all such tumours, when present in the kidney, are primary there, and that any vesical growths present are secondary. Tumours of the renal pelvis have been classified as papilloma, papillary epithelioma, and alveolar carcinoma. The writer thinks that irritation of the epithelium of the renal pelvis or of the collecting tubules within the pyramids is a factor in their causation, and quotes Coryell as stating that the gradual change from normal tissue to inflammatory, from inflammatory to hyperplastic, and from hyperplastic to neoplastic, renders it probable that the chronic irritation brought on by stones was the direct cause of the cancer, and that 64 per cent of carcinomatous kidneys removed at the Mayo Clinic were associated with stones. [This statement does not agree with other collected statistics or with the views generally held.—J. T.-W.]

From an analysis of the 56 cases of *malignant papilloma* of the kidney recorded in the literature, Darnall⁴⁹ states that this condition is more common in males than in females in the proportion of two to one. Antecedent inflammation and stone-formation are regarded by some as etiological factors. Hæmaturia is the most constant sign, and it is usually intermittent in character. Pain is more or less inconstant. Papilloma of the bladder or ureteral orifice may be seen on cystoscopy, a pyelogram may reveal a filling defect of the renal pelvis, and the urine contain atypical epithelial cells. The author considers it best to regard all papillomata of the renal pelvis as malignant, and to treat them radically. Nothing short of complete removal of the affected kidney and as much of the ureter as possible should be done. In cases with implantations in the bladder, these should be fulgurated per urethram at a later date.

Mixter⁵⁰ discusses *new growth* of the kidney, large solitary or multiple renal cysts, polycystic kidney, and congenital hydronephrosis occurring in *infancy and childhood*. Among the causes of hydronephrosis, he has found congenital stricture of the ureter to be relatively not infrequent, and to be associated not uncommonly with infection. Anomalies of the ureter are frequently multiple; thus strictures may be bilateral, and therefore the condition of the other kidney should be determined before performing nephrectomy. Bilateral hydronephrosis may be caused by stricture of the posterior urethra in the region of the verumontanum, where during normal development fusion of the two segments of the urethra occurs. Clinically, cases of congenital hydronephrosis fall into four groups: (1) Those which remain unrecognized, with no symptoms or signs; (2) Those with abdominal tumour; (3) Those with symptoms of infection; (4) Those presenting disturbances of micturition, either frequency or retention. In the last class the symptoms are caused by intravesical protrusion of the ureteral mucosa, which occurs when the stricture is in the bladder-wall. This protrusion may be so large as to occlude the opposite ureteral orifice, or even the internal urinary meatus. Nephrectomy in the presence of a normal kidney and ureter on the opposite side is usually necessary, and the author considers that the transperitoneal route is the best in dealing with the large congenital hydronephrosis of early childhood, in the absence of infection. Large solitary or multiple cysts are very rare, and occur chiefly in adults, only six cases having been reported in children under ten years of age. The condition is unilateral, is more often seen in females, and is slightly more frequent on the right side. The author considers that the majority are probably of the nature of retention cysts, and are usually situated at one or other pole of the kidney. Abdominal fullness associated with dragging pain in the loin are the usual symptoms. Hæmaturia is rare, renal function unimpaired, and the urine normal. The cyst should be enucleated if possible, but usually it is too firmly adherent, and partial nephrectomy with

resection of the cyst may be required. A very large cyst, or severe bleeding following resection, may call for nephrectomy.

Fedoroff⁵⁴ has observed 53 cases of solid renal tumour and has performed a radical operation in 42. He found functional tests to be of little diagnostic value, for the tumour is usually palpable before it is sufficiently extensive to affect the response to the tests. An extraperitoneal lumbar-abdominal incision gave him ample access. The mortality in his 42 cases was 20.6 per cent. Four cases have been under observation after operation for nearly four years, one for six, one for seven, and one for ten years, without recurrence.

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KNEE-JOINT, INTERNAL DERANGEMENT OF.

E. W. Hey Groves, M.S., F.R.C.S.

In spite of the great number of cases of internally deranged knee-joint which are every year submitted to operation, there still remains a large element of doubt both as to the nature of the underlying disease and the most satisfactory method of treating it. Mitchiner¹ has contributed a most valuable paper to the elucidation of this subject. He has collected the results of all cases of the kind operated upon at St. Thomas's Hospital during a period of ten years. They were 225 in number, and of these 134 were traced.

In regard to the various types of internal derangement met with, the following list gives the relative number of each group, and also the percentage of good results following operation.

Group	Total Number	Percentage of Whole Number	Percentage of Good Operative Results
Loose bodies ..	39	17	61
Torn semilunar cartilage }	125	55	77
Synovial fringes ..	27	12	37
Nothing definite	30	13	28
Torn crucials ..	4	2	—

From this it will be seen that a definite lesion of one or other semilunar cartilage is the commonest cause of internal derangement, and that it is this group which gives the best results after operation. The most significant fact in this table, however, is that a negative finding at the operation, followed usually by removal of a normal cartilage, is generally followed by an unsatisfactory result, i.e., the patient is little or no better for the operation. Further, it is noted that in this group, where nothing definite was discovered by the exposure, those cases in which the joint was closed without anything being removed, did better than those in which a normal cartilage was excised.

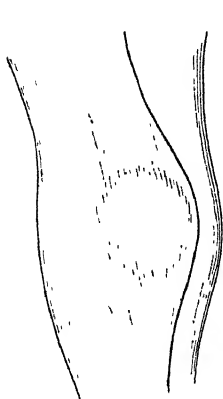


Fig. 60.

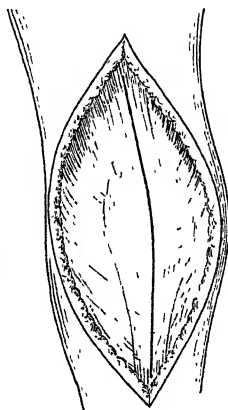


Fig. 61.

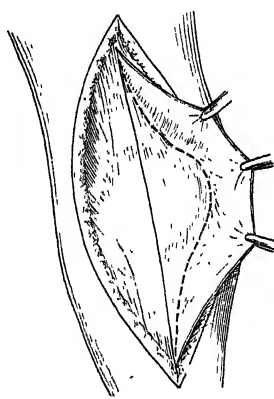


Fig. 62.

A very interesting comparison is instituted between the two *methods of exposure* which were used in all these cases. In the one a vertical or oblique incision was made over the suspected cartilage, and in the other the patella was split by a vertical incision. The lateral incision gives a more rapid and more painless recovery, but it is subject to three disadvantages. (1) It gives so small an access to the joint that it is very difficult to remove the whole of a torn cartilage through it; this is an important point, because in 5 per cent of the cartilage cases subsequent trouble was caused by the continued presence of the inaccessible posterior portion of the meniscus. (2) The greatest disadvantage of the lateral incision, however, is that it is quite unsuited to an exploration of the joint; thus the opposite cartilage, a loose body, or a synovial fringe may be the cause of the trouble and yet may be quite overlooked. (3) The third disadvantage of the lateral incision is that it often causes anæsthesia over the inner side of the knee owing to division of the internal cutaneous nerve. The transpatellar exposure, on the other hand, gives a much better diagnostic exposure of the joint, and allows of more radical operation. Although it causes more post-operative pain than the lateral incision, the ultimate results are better, and

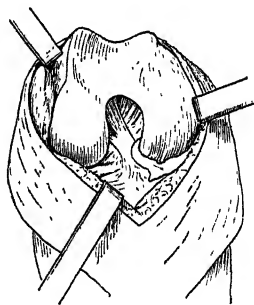


Fig. 63.

Figs. 60, 61, 62, 63.—Stages of the operation of exploratory arthrotomy of the knee-joint (Timbrell Fisher). (By kind permission of 'The Lancet'.)

in the whole series of cases there was not one which showed any evidence of the splitting of the patella causing untoward symptoms.

The course of recovery after operations which ultimately proved successful was much slower than is usually recognized. Thus, in the majority of cases some pain and effusion into the joint occurred after exertion for two or three years after the operation, and then this tenderness passed away altogether. The use of splints for any time after the operation caused marked muscular wasting and greatly prolonged convalescence.

Fisher,² writing on the same subject, lays great stress on the difficulty of making an accurate diagnosis of the nature of internal derangement of the knee. His solution of this difficulty lies in making a free exposure of the interior of the joint by a special incision. He condemns the patella-splitting method on the somewhat theoretical grounds that it causes a lesion of the cartilage which is slow to heal. The incision he advises is a curved one to the inner or outer side of the knee-cap, followed by a median incision of the aponeurosis and a lateral division of the capsule. The patella, thus freed from its lateral attachments on one side, is retracted to the opposite side, and the interior of the joint is well exposed (*Figs. 60, 61, 62, 63*).

Another method of dealing with this same difficulty of verifying the diagnosis before carrying out operative treatment is suggested by Bircher,³ who has employed it in over 20 cases. He uses an instrument like a cystoscope, through which the knee-joint is filled with oxygen or nitrogen, and by means of which a clear view can be obtained of the interior of the joint. In this way the existence of a lesion of one or other meniscus, the presence of a foreign body or a hypertrophied synovial fringe, can be proved; and, most important of all, the cases with no gross lesion can be defined without a big and crippling operative exposure.

A more theoretical but very interesting aspect of internal derangement of the knee is discussed by Axhausen.⁴ *The origin of loose bodies* has ever been a fertile subject for debate. It is probable that whilst trauma and osteoarthritis account for many of the bony and cartilaginous loose bodies, yet some other causative factor must be invoked in many cases. Axhausen suggests that an embolism occurs in a terminal vessel, as the result of which a wedge-shaped mass of bone and cartilage undergoes a quiet necrosis and eventually is shed into the joint. Some further interesting suggestions are made that such obscure conditions as coxa plana and Kohler's disease may also be due to a similar terminal embolism occurring in the head of the femur or in the tarsus.

REFERENCES.—¹*Brit. Jour. Surg.* 1922, Oct., 221; ²*Lancet*, 1923, i, 945; ³*Jour. Amer. Med. Assoc.* 1923, Feb. 3, 363; ⁴*Lancet*, 1922, ii, 403.

LABOUR. (See also ANÆSTHETICS.)

W. E. Fothergill, M.D.

Anæsthetics in Labour.—So long ago as 1880 Klikowitch is said to have used a mixture of nitrous oxide and oxygen for obstetrical purposes. Guedel was one of the first to popularize the combination in the United States, where since 1911 it has come into general use, limited, naturally, by the expense of its administration. The so-called 'twilight sleep' appears to have been recommended by Steinbuchel in 1902, and subsequently was popularized by Kronig and Gause. This method seems to be losing ground. Sollman says: "The use of scopolamine-morphine anæsthesia is justified (if at all) only in specially equipped institutions, and not in private practice, or even in ordinary hospitals." It is said to be applicable in only about 30 per cent of labour cases, and to require special technique and equipment, and trained personnel.

The search continues for a method which shall be available for general use,

in hospital or in private houses, by any medical practitioner. Thus Thaler and Hübel¹ tried an Oil and Ether Mixture introduced slowly into the rectum in 100 cases of labour. The mixture was three parts of ether to four of olive oil; 100 c.c. was used at first, an additional 50 c.c. being given after ten minutes' interval if no marked effect had been produced by the first dose. In the majority of cases three or four doses were given. One patient had eight doses during labour. In 88 cases the result was satisfactory, and in 4 there was absolute failure. Labour appeared to be retarded in 20 cases, and in these quinine or pituitrin was added to the mixture. In 80 cases the labour pains were normal or very strong. In 73 primiparæ the average duration of labour was $20\frac{1}{4}$ hours; while in 27 multiparæ it was $10\frac{1}{4}$ hours. Of the children, 14 were apnœic but breathed within five minutes without treatment; of 2 more severe cases, one was resuscitated and the other died. In this series of cases the patient complained of rectal irritation in only one case. In no case was there excitement. Vomiting occurred in 5 and severe thirst in 7.

F. P. Donovan and J. T. Gwathmey,² of the New York Lying-in Hospital, write on '*painless childbirth by synergistic methods*'. They say that all obstetricians and all authorities are of opinion "that no drug which can so far abolish sensation as to make labour painless can be given to this degree without affecting considerably the normal process of labour". They do not entirely concur; for they consider that by using a number of drugs in minimum doses 'synergistically', analgesia at least can be secured without introducing risk to mother or child or interfering with the normal process of labour. They have experimented in 64 cases, using a four-ounce mixture given by the rectum in one or two doses. They have tried twelve different formulæ, the substances used being Morph. Sulph., Hyoscine Hydrobrom., Mag. Sulph., Alcohol, Glucose, Ether, Urea, Paraldehyde, Urethane, Cannabis Indica, Quinine, and various excipients. The last formula tried contained small quantities of urea, mag. sulph., hyoscine, morphine, glucose, and water, a two-ounce mixture, to be followed twenty minutes later by an injection of $1\frac{1}{2}$ oz. of ether mixed with $\frac{3}{4}$ oz. of oil. This was found to be a useful and safe preliminary for surgical anæsthesia by nitrous-oxide-oxygen-ether, and has been used in several hundred cases. In labour, the results have varied, but in the majority the patients were helped, and in a few comparatively painless delivery occurred. One or two neurotic patients asserted that the pains were intensified. The writers feel that they have established the fundamental principles upon which painless labour may be safely worked out.

Management of the Third Stage.—C. A. Gordon³ believes that interference with the normal mechanism of separation is the commonest cause of retained placenta, hæmorrhage, and infections, and that some of the great teaching clinics fail to impress students with the importance of the expectant treatment of the third stage. The text-books also are not precise and clear. The tendency has been to fix arbitrary time limits for this stage. The general impression has been that delivery of the placenta is commonly by Schultze's mechanism—fetal surface first after the formation of retroplacental blood-clot; and rarely by Duncan's—edgeways, maternal surface first. Weibel delivered 46 women on an X-ray table, injecting the placenta with 60 to 80 c.c. of Lilienfeld's kontrastin as soon as the cord was cut. Serial pictures were then taken with astonishing results. In 21 cases the process of separation and expulsion was followed completely, and in 19 of these the placenta passed through the retraction ring end first as described by Duncan. Gordon has reviewed the subject clinically, making observations in 1600 cases, and confirms the teaching current in the best obstetric circles. The recognition of separation is the important feature in management, the presence of the placenta in the

vagina being recognized by the rising of the firm uterus in the abdomen, and the lengthening of the cord outside the vagina. Expression must not be used until these signs are present, but is often necessary at the proper time; for retention often occurs in the lower birth canal, due to the recumbent position and inability to use the abdominal muscles. The writer sees no reason why the sitting posture could not be used for placentas delayed in the vagina. But the placenta may safely lie in the vagina for many hours. The adherent placenta is rare, and causes no bleeding until partial separation occurs. The completely separated placenta causes no bleeding. The partially separated placenta always causes bleeding, and calls for manual removal. Delay is dangerous after hæmorrhage has begun. [The late Berry Hart* taught these points definitely in the eighties. But to this day, much trouble is due to the fact that students of medicine and pupil midwives are not always taught to distinguish between 'bleeding during the third stage' and 'bleeding after labour is over'. The term 'post-partum hæmorrhage' is unfortunately used to include both kinds of hæmorrhage, 'partum' or 'labour' being misread as ending with the birth of the child. The only safe way is to make three definite groups: (1) Ante-partum hæmorrhage; (2) Bleeding during the third stage, namely partial separation of the placenta; (3) Post-partum hæmorrhage. The only treatment for group 2 is to complete the separation of the placenta, either by compression through the abdominal wall, or, if necessary, by putting a hand inside the uterus.—W. E. F.]

S. Seides⁴ reports upon the routine use of Pituitrin in the third stage of labour. Five hundred consecutive cases received each 0.5 c.c. of pituitrin at the beginning of the third stage. The uterus was untouched save when the attendant sought for signs that the placenta had left the uterus. There was one case of simple retention, and there were three of adhesion of the placenta requiring manual removal. The loss of blood was surprisingly small. Involution was more rapid than usual. The average duration of the third stage of labour was reduced to seven minutes. Post-partum hæmorrhage did not occur. The use of pituitrin renders unnecessary all uterine manipulations before the separation of the placenta, and manual expression after separation. The writer considers the 500 cases to demonstrate that the method is perfectly safe, of distinct benefit to the patient, and of considerable advantage to the accoucheur.

REFERENCES.—¹*Zentralb. f. Gynäköl.* 1923, March, 337; ²*Brit. Jour. Anaesth.* 1923, July, 8; ³*Amer. Jour. Obst. and Gynecol.* 1923, April, 403; ⁴*Surg. Gynecol. and Obst.* 1923, Jan., 103.

LARYNX, DISEASES OF.

A. J. M. Wright, M.B., F.R.C.S.

Carcinoma.—

Pre-cancerous Conditions of the Larynx.—For clinical purposes the term 'pre-cancerous' may be defined as any histologically abnormal condition intervening between the normal and the cancerous. Such conditions are recognized in other parts of the body, and Jackson¹ brings evidence suggesting that similarly pre-cancerous lesions can be recognized in the larynx. It is probable that repeated injury and long-continued irritation and inflammation are potent causes of cancer. In the case of the larynx, it is recognized that prolonged vocal abuse is one of the causes of chronic laryngitis, keratosis, papillomata, and granulomata of the larynx. That vocal abuse is an etiological factor in these conditions is shown by the remedial efficacy of absolute silence. It seems certain that such curable laryngeal conditions are followed in some

* See *Selected Papers* by D. Berry Hart.

cases by carcinoma. From a clinical point of view we may regard continual laryngeal irritation from any cause—chronic laryngitis, keratosis, syphilis, pachydermia, so-called prolapse of the ventricle, and benign growths occurring in individuals of cancerous age—as clinically pre-cancerous, and as such they should be cured, surgically or otherwise. Jackson has himself observed the presence of an extensive carcinoma which had developed in the site of a prolapse of the ventricle which was present ten years previously. As far as syphilis is concerned, in twelve cases a syphilitic lesion preceded the cancerous. This association is, of course, well recognized in the case of the tongue. As far as the association of benign and malignant new growths is concerned, the author has seen a number of instances in which lesions, histologically papillomatous and carcinomatous respectively, have developed in the larynx side by side. The great preponderance of squamous-celled carcinomata pri-

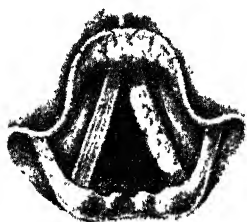


Fig. 64.—Keratotic disease of the vocal cord. (Redrawn from *'Annals of Surgery'*.)

marily located in the cords indicates the possibility of irritation as a factor, the cords being undoubtedly more subject to trauma or irritation than any other part of the larynx. Cases illustrative of these points are given, and one particularly is emphasized, in which a chronic keratotic lesion was present on the vocal cord of a male, age 42 (Fig. 64). This was removed by thyrofissure, and was, on histological examination, regarded as showing changes in the epithelium almost certainly pre-cancerous in type. The lesson seems to be that chronic laryngeal lesions in individuals of cancerous age should, if possible, be cured surgically or otherwise, and that there will be

fewer deaths from laryngeal cancer when every member of the profession realizes the frequently serious nature of chronic hoarseness.

Stenosis.—Reference was made last year (MEDICAL ANNUAL, 1923, p. 258) to the devising of operative methods for the relief of laryngeal stenosis resulting from a bilateral paralysis of the vocal cords. Irwin Moore² has considered in detail the various possible operations, and describes a new one, cordopexy, the idea of which was first suggested by Wilfred Trotter. In cases of laryngeal stenosis from double abductor paralysis, there is a small glottic chink, which is closed more completely on inspiration, the cords being sucked together. Expiration is free, and the voice normal, or nearly so, but accompanied by a stridulous noise. The commonest cause is a bulbar lesion, usually tabetic. Stenosis only exists during the stage of partial, i.e., abductor, paralysis, and should the condition progress to complete paralysis, the cords move outwards, the glottis is widened, and the obstruction relieved. This, however, is not the usual course, and of 53 cases observed, only 6 progressed to complete paralysis. It is wise, however, to wait at least six months to see if the stenosis will be relieved in this way or not, before considering operation. The objection to waiting an indefinite period is that considerable atrophy occurs, with fixation of the crico-arytenoid joints, rendering any relief more difficult.

The possible operations for consideration are: (1) Division of the recurrent laryngeal nerves. This has not proved successful, probably owing to muscular contractures. (2) Excision of a vocal cord. This has proved unsuccessful, owing to the fact that the cord is always replaced by a fixed cicatricial band, with frequently an actual increase in the stenosis. (3) Removal of the arytenoid. This has proved unsuccessful in the few cases recorded.

PLATE XXXII.

PROLAPSE OF LARYNGEAL VENTRICLE

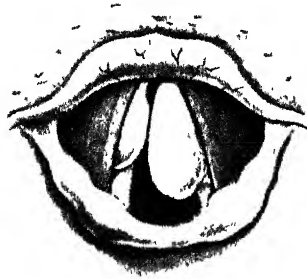


Fig. A.—Prolapse of both ventricles of the larynx (Lefferts' case).



During respiration. During attempted high chest notes.
Fig. B.—Eversion and prolapse of both sacculi laryngis (Louis Elberg's case).



Fig. C.—Prolapse of the laryngeal sac (Solis-Cohen's case).

*By kind permission of Dr. Truman Moore, from
his article in the Journal of Laryngology and Otology*

(4) Ventricular stripping. Although successful and the operation of choice in the horse, as pointed out last year, it is not a possible operation in man. (5) Ventriculo-cordectomy. This operation, advised by Jackson, has given some measure of success, 11 of his 18 operated cases being successful. (6) Cordopexy, the operation now suggested, has not yet been performed. It consists essentially in the displacement outwards of the vocal cord. This is done through an external incision in the neck, the portion of thyroid cartilage to which the anterior end of the cord is attached being detached and displaced outwards. The method of performing the operation will be readily understood by reference to Figs. 65, 66.

Sargnon and Toubert³ have described an operation with a similar object, but possibly suitable to cases of laryngeal stenosis from other causes. It consists essentially in a laryngostomy—that is, a splitting of the larynx, with suture of the margins of skin to the mucous membrane, leaving it as an open trough—combined with a sub-mucous removal of the arytenoid cartilage on either side and of

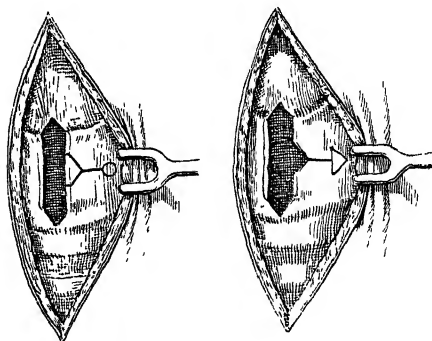


Fig. 65.—Cordopexy. Shows a thyrofi ssure followed by antero-lateral transplantation of the vocal coril. (Figs. 65, 66 redrawn from the 'Proceedings of the Royal Society of Medicine'.)

the mucous membrane lining the laryngeal ventricle. The larynx is packed for a period, and the cords become fixed in an abducted position.

Tracheotomy.—Brinzel⁴ advocates the use of a transverse incision in the skin and trachea to replace the vertical one usually employed. He finds that this new incision gives the following advantages. The transverse skin incision gapes when the head is inclined backwards, thus giving better exposure. The

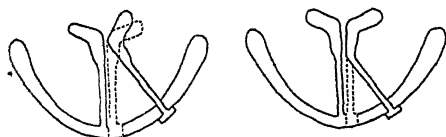


Fig. 66.—Cordopexy. The first diagram shows glottic space obtained if the crico-arytenoid joint is motile; the second diagram, the same if the joint is fixed.

transverse incision is less apt to be contaminated by wound secretion. The resulting scar is hardly visible, as it lies in a fold of the skin. The skin and tracheal wounds can only adhere over a short length. The transverse tracheal incision gapes without the aid of an instrument, and there

is therefore no need for haste in the introduction of the tube.

Prolapse of the Ventricle.—This term has included, in the past, a somewhat indefinite group of cases characterized by the presence of a swelling above the true vocal cord and apparently connected with the laryngeal ventricle (*Plaque XXXII*). The laryngeal ventricle is a horizontal space, elliptical in shape, lined by mucous membrane, and situated between the true and false cords, from the roof of which space towards the anterior part there arises a vertical pouch known as the sacculus. Irwin Moore⁵ has made a detailed study of 85 reported cases of prolapse of the ventricle. He defines ventricular prolapse as a protrusion of a portion of the ventricular mucosa as a result of inflammatory oedema or hyperplasia. In addition, rarely, eversion of the sacculus may occur. The varieties of prolapse met with may be grouped as follows:—

Group 1.—Protruding folds of mucosa due to : (a) Mechanical causes, voice strain, etc. ; (b) Acute inflammatory causes, i.e., acute laryngitis ; (c) Chronic inflammatory causes, i.e., tuberculosis, syphilis, etc.

Group 2.—Eversion, as a result of the traction of cysts and tumours. The symptoms due to this condition, whatever the cause, are chronic cough, hoarseness, or aphonia. Treatment is directed to the causative disease, with, in addition, the use of voice rest, local astringents, or the cautery applied to the protruding mucous membrane. Eversion of the sacculus, when it occurs, is recognized by the presence of a tumour in the anterior third of the glottis which is free from any attachment to true or false cords and can be replaced into the ventricle with a probe. Treatment of such a condition is removal.

Laryngeal Tuberculosis.—

Resection of the Superior Laryngeal Nerve.—The use of alcohol injections into the superior laryngeal nerve for the relief of dysphagia in cases of advanced laryngeal tuberculosis is recognized as being frequently useful. The disadvantages of the method are that it is not always easy to be certain of actually paralysing the nerve, and the duration of the anaesthesia is also uncertain. Bjalo⁶ has employed for the same purpose the resection of the nerve through an external incision. He has carried out the operation in 20 patients, in 5 of them on both sides. The operation is performed under local anaesthesia by a horizontal incision parallel to the upper border of the thyroid cartilage. The nerve can usually be identified without difficulty mid-way between the upper border of the thyroid cartilage and the greater cornu of the hyoid bone. As an immediate result of the operation, the submaxillary and cervical glands become swollen for a few days. Swallowing the wrong way is also a troublesome after-complication. Pain, however, was entirely relieved in all the cases, and was not seen to return. The method is effective, but should be reserved for cases in which other remedies do not give relief.

REFERENCES.—¹*Ann. of Surg.* 1923, Jan., 1 ; ²*Jour. of Laryngol. and Otol.* 1923, May, 236 ; ³*Ann. de Mal. de l'Oreille, du Larynx, du Nez, et du Pharynx*, xl, No. 2 ; ⁴*Médec. Klinik*, 1922, xviii, 337 ; ⁵*Jour. of Laryngol. and Otol.* 1922, 265 ; ⁶*Tuberkules*, 1922, i, 12.

LEAD POISONING. (See MEDICO-LEGAL POINTS.)

LEISHMANIASIS.

Sir Leonard Rogers, M.D., F.R.C.P., F.R.S.

ETIOLOGY.—H. M. Perry¹ describes remarkable changes he found in the microscopical appearances of the mucous membrane of the small intestine in a kala-azar case showing no marked naked-eye lesions of that structure, but the villi proved to be greatly enlarged and polypus-like, due to intense proliferation of the lymphatic endothelial cells, which under a high power were found to be crammed with Leishman-Donovan parasites. The probable mode of infection is discussed, and although insect transmission through infection from the blood is considered the most likely method, the possibility of faecal transmission is thought to be worthy of careful consideration. Helen A. Adie² publishes microphotographs by C. M. Hutchinson of the protozoal bodies she found in the salivary glands and ducts of bed-bugs caught in a kala-azar-infected house, most of which were mononucleated, but a few showed two nuclei closely resembling those of the human stage of the *Leishmania donovani*. F. P. Mackie³ contributes a valuable summary of our knowledge of the kala-azar problem to a Madras discussion at the Indian Science Congress, in which he concludes that, although faecal transmission must be considered, the weight of the evidence is in favour of insect transmission, and he suggests that the sandfly is the most likely carrier, in view of its having been proved to transmit the very similar parasite of dermal leishmaniasis ; he states

that, in a laboratory-bred nymph, he had just found crinithidial-like flagellates seventeen days after a feed on a kala-azar patient. R. Row¹ discusses the reversion of the flagellate stage to the non-flagellate human torpedo form, in the presence of which alone are inoculations of cultures infective, and he finds them developing in old, partially dried N.N.N. cultures. H. E. Short⁵ reports numerous attempts to infect animal life with *Leishmania donovani*, nearly all with negative results, except in the case of 10 out of 13 successes in *Macacus rhesus* monkeys, two of which developed acute kala-azar, but the others showed no symptoms and were only proved to be temporarily infected by means of cultural methods. Numerous attempts to infect monkeys and other animals by feeding them on the faeces of kala-azar cases and on water contaminated with faeces all gave negative results.

B. Blacklock⁶ draws attention to the work of various observers on herpctomonads in plant-bugs, and records having been bitten by such a bug. He therefore thinks this class of insect worthy of investigation in regard to kala-azar. T. C. McCombie Young⁷ has worked out the season of onset of kala-azar in different Assam districts, and concludes that one type of onset is in the cold-weather months in the Nowgong and Sibsagar districts in the east of the Brahmaputra valley, and another in the hot weather in the Lower Assam valley and Sylhet.

SYMPTOMS.—L. E. Napier⁸ has furnished a detailed analysis of the clinical picture based on 300 carefully observed cases under his care at the Calcutta School of Tropical Medicine, compared with 140 cases with enlarged spleen but negative on spleen puncture, which brings out the following points. The percentage of the spleen cases proved to be kala-azar varied from 88 per cent in Calcutta to 30·8 per cent in South-West Bengal; between 8 and 10 years of age, 71 per cent to 83 per cent were kala-azar, half the total cases of which belonged to those ages; 12·5 per cent began with a double daily rise of temperature, 88 per cent of such cases proving to be kala-azar; a family history was found in twice as many kala-azar as non-kala-azar cases; rigors were of no differential diagnostic importance; cases with a history of illness for over eighteen months were mostly non-kala-azar ones; the date of onset of kala-azar cases shows a very distinct rise during the winter months; a good appetite is commoner in early cases of kala-azar, and loss of weight in later ones, but emaciation is three times as common among the kala-azar cases, being much more marked in the early stages; extreme anæmia was decidedly less frequent in kala-azar than in other cases; congestion of the abdominal veins was nearly twice as frequent in the kala-azar cases; rapid pulse was more often seen in kala-azar; enlargements of the spleen to 3 to 6 in. below the ribs, and soft spleens, were more frequent in kala-azar, and to 8 in. and over and hard spleens in other cases; the liver was more enlarged in kala-azar; while sex incidence, epistaxis and bleeding from the gums, and lung symptoms were found about equally in the two conditions. Probably 80 per cent of the non-kala-azar cases were recurrent malaria or malarial cachexia, and clinically correct diagnoses were made before spleen puncture was performed in 88·24 per cent of the series.

L. E. Napier⁹ also reports further experience of the 'aldehyde test', the term he now applies to the discredited formol-gel test for syphilis. To 1 c.c. of clear serum 1 drop of formalin is added in a small test-tube; the contents are shaken and left at laboratory temperature and noted from time to time. In kala-azar cases the serum becomes cloudy at once and viscid, and in about ten minutes resembles in colour and consistency the white of a hard-boiled egg; for a positive test the serum should become solid and completely opaque within two to twenty-four hours. Owing to the large number of cases seen in the

Carmichael Hospital kala-azar clinic, the general use of spleen puncture for diagnosis has had to be given up except in a few cases each day, and the aldehyde test, with the history of the cases, is mainly relied on for diagnosis. A single spleen puncture gives 89 per cent of positive results in true kala-azar cases, and the aldehyde test gives 81 per cent of correct diagnoses, while the former method gives 9 per cent of incorrect returns against 3 per cent by the aldehyde.

U. N. Brahmachari¹⁰ states that the reaction of the aldehyde test depends on an excess of globulin in kala-azar sera, which he pointed out, and he describes a test based on the degree of opacity produced on diluting the sera with water.

DISTRIBUTION.—L. E. Napier¹¹ writes on the incidence of kala-azar in Bengal, and points out that the disease is more common than has been thought, as at a village treatment centre within four months 33 per thousand of the neighbouring population had been treated for the disease, which would give at the same rate over one million cases in Bengal. J. Cunningham¹² has examined the records of the Madras hospitals for kala-azar, and finds Georgetown still shows a large proportion of the cases, although he thinks the disease is extending southwards. The same worker¹³ finds that there is no conclusive evidence of any other endemic focus in Southern India apart from Madras City.

TREATMENT.—T. McCombie Young¹⁴ records the treatment of 26,000 kala-azar cases in Assam within two years by intravenous injections of Antimony salts, with 23,000 recoveries, apart from the still greater saving of life through the control of the spread of the serious recrudescence of the disease throughout the Assam valley which manifested itself in 1919. A special organization under him as Sanitary Commissioner carried out the work, which demonstrated that when the first case or two in any village were discovered and treated, as a rule no further cases occurred, instead of the usual loss of half to two-thirds of the inhabitants of the village such as reduced the inhabitants of the Nowgong district by one-third in the last decade of the nineteenth century before the present methods of control were available. Under the Epidemic Diseases Act the treatment can be enforced when necessary, while when a number of cases have occurred in any village before the disease is discovered, the system of evacuation of the infected village site, the value of which was established by Rogers and Dodds Price two decades ago, is also carried out, and has proved very successful in fourteen villages in the last two years. Details of two of these are given in the paper, which clearly establishes that the recent recrudescence is being effectually controlled by these measures and the further depopulation of the province prevented. Fortunately for Assam, the recent proposal on 'economic' grounds to abolish the Sanitary Commission, whose work on kala-azar is saving the province untold wealth as well as thousands of lives, has been dropped.

R. N. Chopra and L. E. Napier¹⁵ have summarized the therapeutics of antimony, by means of which drug the death-rate of 95 per cent in kala-azar has been converted into a recovery-rate of nearly the same figure. They advise in adults beginning with 0.5 per cent of a 2 per cent solution of the sodium or potassium salt, the former being slightly less toxic and irritant, increased at each dose by 0.5 c.c. up to a maximum of 5 c.c. as long as no toxic symptoms appear, and given on alternate days for from two to four months. L. E. Napier¹⁶ reports very unfavourable results from the use of 'Stibenyl' in kala-azar, both on account of its failure to cure and on its dangerous toxic properties. U. N. Brahmachari¹⁷ has tested the toxicity of various antimony salts, and finds Ammonium Antimonyl Tartrate and Urea Stibamine less lethal than the sodium and potassium antimonyl tartrates in guinea-pigs, and he

reports a few cases of kala-azar recovering under bi-weekly intravenous injections of 2 to 9 c.c. of a 2 per cent solution of ammonium antimonyl tartrate, and under 0.15 to 0.3 gm. in 2 per cent solution of urea stibamine twice a week intravenously. The symptoms of vomiting and purging are stated to be not great after these injections. W. York¹⁸ records one case of kala-azar successfully treated with 'Bayer 205' after the temperature had fallen under rectal injections of tartar emetic, but without disappearance of the parasites from the spleen. Doses of 0.25, 0.5, and two doses of 1 gm. were given intravenously without any toxic effect, and in a month the spleen had greatly decreased, and become negative for parasites on puncture; 14 lb. weight had been gained, and he appeared to be well and left for India. L. E. Napier¹⁹ reports the complete failure of a careful trial of Bayer 205 in kala-azar, the cases getting worse while on the treatment, in spite of a total of 4.75 and 5.75 gm. having been administered in two of them, while they subsequently yielded to the usual antimony treatment. R. G. Archibald,²⁰ in the Sudan, found a close relationship between high humidity and the prevalence of kala-azar, and that his patients could not stand as large doses of Tartar Emetic as are used successfully in India; but by only giving from 0.5 to 1.5 gr. at ten to fourteen days' intervals over several months the disease could be cured.

F. P. Mackie²¹ records experience in Shillong to show that the statement that a total of 200 c.c. of a 1 per cent solution of Sodium Antimony Tartrate suffices to cure nearly all cases of the disease is not correct of Assam, where the only reliable test of cure, namely cultures of the spleen juice, showed the majority were not cured by such doses, and that some require considerably more, so no fixed quantity should be laid down, but all cases treated until the above test is negative, or, if cultures are not available, until all the clinical signs of cure are evident. H. E. Short and R. T. Sen²² have come to a similar conclusion from work in Shillong, and also record five cases of the disease which showed cure as above defined within the short time of two to three weeks under intravenous injections of Urea Stibamine, beginning with 0.1 gm. in cold distilled water, increased at each dose by 0.05 gm. up to 0.25 gm. on alternate days. J. Dodds Price,²³ writing of thirty years' experience in the Nowgong District of Assam, points out that the recent recrudescence of kala-azar on tea gardens there would have ruined them but for the antimony treatment, while relapsing cases also yield to prolonged use of the drug, and he has not met with any antimony-resistant cases. J. Cunningham and P. S. Varadarajan,²⁴ on comparing the antimony with previous methods of treatment, found that 92.5 per cent of the recoveries were due to antimony.

REFERENCES.—¹*Jour. R.A.M.C.* 1922, Nov. 323; ²*Ind. Jour. Med. Research*, 1922, July, 236; ³*Ind. Med. Gaz.* 1922, Sept. 326; ⁴*Ind. Jour. Med. Research*, 1922, Oct., 476; ⁵*Ibid.* 1923, April, 1150; ⁶*Brit. Med. Jour.* 1923, ii, 237; ⁷*Ind. Med. Gaz.* 1923, Feb., 52; ⁸*Ibid.* 1922, Nov., 406, and Dec., 446; ⁹*Ibid.* March, 104; ¹⁰*Ibid.* 1923, July, 295; ¹¹*Ibid.* 299; ¹²*Ibid.* 301; ¹³*Ibid.* 308; ¹⁴*Brit. Med. Jour.* 1923, ii, 430; ¹⁵*Ind. Med. Gaz.* 1923, Jan., 1; ¹⁶*Lancet*, 1923, i, 280; ¹⁷*Ind. Jour. Med. Research*, 1922, Oct., 492; ¹⁸*Brit. Med. Jour.* 1923, i, 370; ¹⁹*Ind. Med. Gaz.* 1923, Sept., 415; ²⁰*Amer. Jour. Trop. Med.* 1923, July, 307; ²¹*Ind. Med. Gaz.* 1923, July, 293; ²²*Ibid.* 289; ²³*Ibid.* 296; ²⁴*Ibid.* 307.

LEPROSY.

Sir Leonard Rogers, M.D., F.R.C.P., F.R.S.

ETIOLOGY AND DISTRIBUTION.—E. L. Walker¹ discusses the relationship of acid-fast diphtheroid bacilli to leprosy in the light of his bacteriological researches in San Francisco, during which he cultivated four types of these organisms from lepers, one of which presented the characters described by Bordoni-Uffreduzzi and subsequent workers as those of the lepra bacillus, but he was unable to distinguish it in any way from the smegma bacillus. E. Marchoux² has infected white rats with the *Mycobacterium pulchiforme* he obtained from a

leprosy-like patient, and thinks there is a disease in man resembling leprosy, but caused by an acid-fast bacillus transmissible to white rats.

L. Rogers³ publishes maps of the world and of India showing a close relationship between high rainfalls and high leprosy incidence, and very low tropical rainfalls and very low leprosy rates, and he suggests that a hot humid climate favours the life of the lepra bacillus outside the body, thus giving it a better chance of gaining access to the human body; and also such climates favour abundance of insect life, the bites of which may afford suitable opportunities of access to the deeper dermal tissues, which are so favourable to their multiplication.

L. Gomez, J. A. Basa, and C. Nicolas⁴ describe the early lesions met with in the children of lepers who were permitted to live with their parents in the Collion Colony, and show that of 24 with positive skin lesions only 13 gave positive nasal ones, and in no case did the nasal lesions appear before the skin ones, which is strongly against Stricker's theory that the nose is commonly the primary seat of infection. The earliest lesions were irregular, smooth, light-coloured macules, most often seen on the trunk, buttocks, extremities, and face, leprosy bacilli being found when a reddish tint develops. Anæsthesia usually first appeared on the ulnar side of the forearm and the peroneal area of the leg. Of 83 children separated from leprosy parents when from a few months to 8 years of age, 30 had died or left the colony, 26 were healthy, and 22 had leprosy or suspicious signs of it, 11 being bacteriologically positive, the signs having appeared from 2½ to 11 years of age and from three months to four years after isolation. Further, of 308, including all very young children, who had lived in association with leper parents, 33·2 per cent show either actual evident (14·2 per cent) or suspicious (18·8 per cent) signs of the disease, while in those 10 to 13 years of age no less than 36·8 per cent had definite infections, and the rate diminished with the decrease of age and consequent shorter exposure to infection, the great susceptibility of children to leprosy being thus emphasized.

E. Muir,⁵ in a comprehensive paper, deals with the spread of leprosy through the body from the initial lesions, the surface body distribution of which he has made out from a study of 975 early cases; the scalp was free, a preponderance of face lesions radiating from the nose, being probably due to nasal infections spreading through the lymphatics; a great excess of primary lesions on the extensor surfaces of the limbs was attributed to their being most exposed to insect bites and other injuries likely to be contaminated by scratching, while an excess on the soles of the feet, only met with in races living in rocky hill districts, and not in those on alluvial soil, all point to the entrance of the lepra bacilli through the skin and superficial mucous membranes. From these initial lesions the bacilli spread through the lymphatics, and during the periodical exacerbations also through the blood-stream, the nerves being involved by both methods by the latter route and by spreading up the lymphatics of the nerves from the skin. The lungs are rarely involved, round clumps of the bacilli being then found in the sputum; but this complication yields to treatment more rapidly than the skin lesions. The pathology of the lesions is also considered, and the inadequacy of the present nomenclature to describe the early stages is pointed out. Muir divides the disease into skin and nerve forms; and the former into papillary, when only the tissue just beneath the epithelial layers is affected; interfollicular, when the layers between the hair follicles is involved, producing raised linear thickening between the rows of hairs; and subfollicular, when the lesions extend still deeper and obliterate the lines of the hair follicles, producing smooth, raised patches or nodules. Variations in pigmentation are also described, and the importance

PLATE XXXIII.

NODULAR LEPROSY

(SIR LA OSAURO RICHARDS)



CASE 1.—Before treatment.



After three months' treatment.

PLATE XXXIV.

NODULAR LEPROSY—continued



Case 2.—Before treatment.



After treatment.

PLATE XXXV.

NODULAR LEPROSY—continued



Case 3.—Advanced nodular leprosy before treatment.



After twenty-one months' treatment.

of distinguishing these types in relation to treatment is emphasized (which will be dealt with more fully in a later communication), without attention to which the best results of the improved methods of treatment will not be obtained, much more than merely injecting a routine dose being involved.

TREATMENT.—H. Morrow, E. L. Walker, and H. E. Miller⁶ report on the treatment of 21 advanced lepers in the San Francisco hospital by weekly intramuscular injections of **Ethyl Ester Chaulmoograte** for three to eighteen months with rather disappointing results; 1 died of leprosy, 1 old man of pneumonia, 3 advanced cases got worse, 9 showed no improvement, 2 improved markedly, and 3 slightly, while 2 absconded. One of the authors therefore visited Hawaii, and found that of 150 paroled patients 10 at least had died, while 20, or 8 per cent, had returned to hospital with recurrences of the disease, and paroled patients are now receiving weekly injections for two years. The authors are satisfied that the remedy is of great value in early cases, but not in many advanced ones. P. Harper⁷ reports further on intravenous injections of **Chaulmoogra Oil** with **Ether**, two years' treatment in 37 cases, 26 being very advanced nodular cases, now showing 5 discharged, 5 further improved, 12 unchanged, and 15 worse. In all 265 cases have been treated for from a few weeks to two years, 40,000 injections having been given without serious mishap: 11 (5 very aged) died, 28 are improved, including 15 discharged, 195 are unchanged, and 81 are worse. Other treatments, including tartar emetic intravenously, have given worse results. E. Muir⁸ reports some further progress, but warns that special training and experience are necessary to obtain the best results, and each case must be carefully studied. Lately the **Ethyl Ester Hydnocarpate** has been injected into the local lesions, using the following mixture: hydnocarpus esters 1 c.c., olive oil (sterilized on water-bath for half an hour and free from fatty acids) 3·5 c.c., creasote (doubly distilled) 0·5 c.c., and camphor 0·5 grm., the dose gradually being increased up to 4 c.c.; the needle is inserted at either pole of the area dealt with, and pushed in four directions from each puncture to distribute the dose. The pain is slight and can be controlled with ethyl chloride, several patches being dealt with each week as long as no severe general reaction occurs. Anæsthetic as well as macular patches can thus be cleared up. Attention to the general health, including treatment for complicating syphilis and hookworm infection, is essential to success. *Plates XXXIII, XXXIV, and XXXV* illustrate cases of nodular leprosy treated with ethyl ester hydnocarpate. F. G. Cawston⁹ obtained some improvement in the temperature of two acute cases with **Colloidal Antimony** and **Sulphur**, but disappointing results with tartar emetic. Gougerot¹⁰ reports three cases rapidly cleared up with weekly or bi-weekly doses of from 1 to 4 c.c. of **Amino-arsenophenol** (éparséno), and he quotes similar results in 17 cases treated by J. Hasson in Egypt.

REFERENCES.—¹*Amer. Jour. Trop. Dis.* 1923, July, 293; ²*Bull. de l'Acad. de Méd.* 1922, May 16, 545; ³*Trans. Roy. Soc. Trop. Med. and Hyg.* 1923, Feb. 15, 440; ⁴*Phil. Jour. Sci.* 1922, Sept., 233; ⁵*Ind. Jour. Med. Research.* 1923, July, 239; ⁶*Jour. Amer. Med. Assoc.* 1922, Aug. 5, 434; ⁷*Jour. Trop. Med. and Hyg.* 1923, Jan. 1, 7; ⁸*Ind. Med. Gaz.* 1923, Jan., 38; ⁹*Jour. Trop. Med. and Hygiene*, 1923, Nov. 1, 345; ¹⁰*Bull. et Mém. Soc. méd. Hôp. de Paris*, 1922, Nov. 2, 1379.

LEUKOPLAKIA BUCCALIS.

E. Graham Little, M.D., F.R.C.P.

Hazen and Eichenlaub¹ draw attention to the paucity of literature upon this condition, which is nevertheless not uncommon, and they report 10 cases. They give special attention to the early phases. The first appearance is often a bluish-white or bluish-red patch on the mucosa, which becomes later a pearly or milky white, slightly indurated patch. The commonest sites are the tongue, the buccal surface of the cheeks, the gums, and the lips. Cracking, fissuring,

and ulceration are later stages. Extensive ulceration usually means cancer. Bad teeth were a very frequent accompaniment. Smoking, naturally, was commonly met with. Syphilis was by no means so predominant a cause as might be anticipated, 7 of the cases being probably attributable to non-syphilitic agencies. Tobacco would seem to play much the more important part, while either septic or rough teeth were found in all ten cases.

The treatment suggested follows these findings. The teeth should be carefully investigated and treated, and tobacco interdicted. The authors deprecate radiation, and prefer the use of the actual cautery under local anæsthesia.

REFERENCE.—¹*Jour. Amer. Med. Assoc.* 1922, Oct. 28, 1487.

LIP, CANCER OF.

Sir W. I. de C. Wheeler, F.R.C.S.I.

Shepherd¹ discusses squamous-cell epithelioma of the lip. He considers that cancer of the lip can be graded microscopically, according to the degree of malignancy, into four groups, and that operation should be planned accordingly. He concludes: (1) Squamous-cell epitheliomata vary in their degree of malignancy. (2) On account of this variation in malignancy 'cancer cures' do cure a certain percentage of lip cancers. (3) It is practical to grade squamous-cell epithelioma according to their degree of malignancy. (4) Rational treatment of squamous-cell epithelioma depends upon a proper grading as to their degree of malignancy.

REFERENCE.—¹*Surg. Gynecol. and Obst.* 1922, July, 107.

LIVER FUNCTION TESTS.

O. C. Gruner, M.D.

Modern medicine aims more and more at perfecting tests of the functional capacity of organs. The possibility of assessing the functional efficiency of the liver first appeared as a result of Claude Bernard's work on alimentary

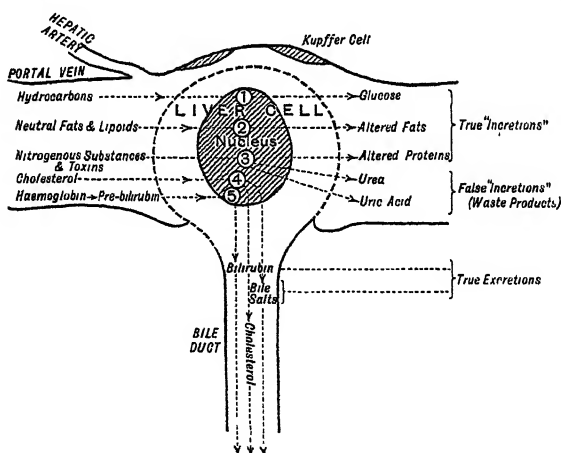


Fig. 67.—To illustrate the assessable functions of the liver cell. (O. C. G.) (1) Glycopenic power; (2) Adipopenic power; (3) Proteopenic power; (4) Cholesterinogenic power; (5) Chromopenic power.

glycosuria, and the science has grown until we now have what Chauffard¹ calls a 'chemical semeiology' with all its complexities.

The subject may be visualized in the form of the accompanying diagram (Fig. 67), where the various functions of the liver are represented as 'powers'¹

within one single cell, the 'liver-unit' [principle of the histological physiological units.—O. C. G.²]. Each of these powers comprises several chemical processes.

The special difficulties of the problem are: (a) There is a great reserve capacity in the liver, so that extensive damage may be received without evident loss of function. (b) There is a great power of compensatory hyperplasia; (c) Any given substance remains in the cell for only a short time and, especially in disease,¹ fluctuates rather widely and rhythmically; a low concentration of substance may still be consistent with functional adequacy. (d) The efficiency of the kidney must be taken into account.

The relation between the various tests and the several powers may be tabulated as follows:—

Name of Test	Power Tested	Disease Concerned
Hæmolclasic crisis Nitrogen-partition test	Proteopexic Desaminating; uricolytic	Cirrhosis Cholelithiasis Gastric defects
Phenoltetrachlorphthalein Methylene blue test Camphor test	Toxicopexic; uricolytic	Gout
Van den Bergh's test Urobilin test	Chromopexic	Cirrhosis Cholelithiasis Gout
Blood-cholesterol	Cholaligenic	Gall-stones Gout
Levulose test Diastase test	Glycopexic	Cirrhosis
Fat in stools Lipase test	Adipopexic	Pancreatitis

I. Proteopexic Power.—

The Hæmolclasic Crisis of Widal.—This term is applied to a group of vascular, hæmatological, physical, or biological phenomena constantly met with in man and animals under certain conditions (Legrand³). It is named 'crisis' because it comes on suddenly and lasts only for a short time. Briefly, one observes whether the white-cell count, instead of rising, falls after a meal, and whether the blood-pressure falls by 20–25 mm. Hg. The meal consists of about 7 ounces of milk. Counts are made every 15 minutes for 1½ hours. The fall in the white cells should be at least 25 per cent, and within half an hour (Framm⁴). This would constitute a 'crisis'. Zehnter⁵ makes a differential count as well, but there is a conflict of findings in regard to whether the neutrophils rise or not. In addition, there is a fall in number of the blood-platelets, the coagulation time is prolonged, the refractive index of the serum increases, and the sedimentation-rate of the red cells increases. These go to support Widal's contention that the reaction is a definite one.

Results: Feinblatt⁶ worked out the average curves in 80 healthy medical students (Fig. 68). The findings in disease are not consistent. Semjen⁷ regards the test as specific. Retzlaff, Holzer, Schilling, and others⁷ find occasional exceptions. Kisch⁷ finds it positive in gall-stone cases. The failures (Lauda and Schmidt,⁸ etc.) are attributable to 'peptone immunity', or to defective absorption of the test-meal. These authors found that half their cases of non-hepatic disease give a positive reaction (e.g., appendicitis,

tuberculous peritonitis, malaria). Framm gets this result in 45 per cent of his non-hepatic cases; 30.6 per cent of his hepatic cases give a negative result. Zehnter obtained a negative in 50 per cent of his hepatic cases. It is positive in 33 per cent of cases of normal pregnancy.

Glaser⁷ and Muller⁸ have questioned whether the test is a true liver-function test at all. From many experiments they believe the phenomenon may be due to overtone of the vagus and sympathetic nerves.

Umber has attempted to increase the value of the test by giving the milk per rectum as a second step. The milk will now enter the circulation before reaching the liver, and there should be no crisis.

In spite of the ambiguities, the test is given high consideration in France. The chief definite conclusion is that a negative reaction does not exonerate the liver from blame.

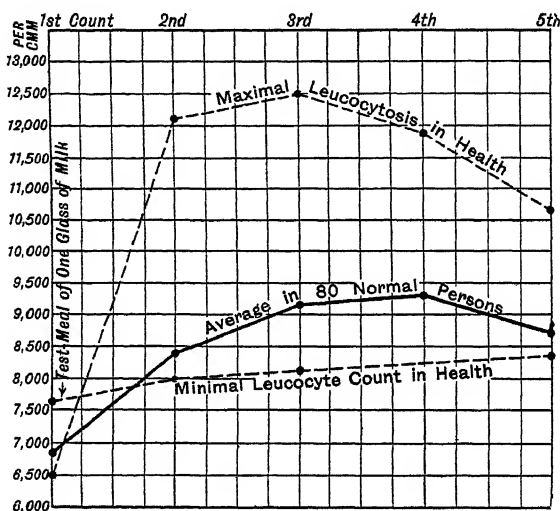


Fig. 68.—Post-alimentary leucocyte curves in health. (A count is made every half-hour. (After Feinblatt.)

Nitrogen-partition Test.—The difficulty in interpreting this test is that the threshold of urea varies greatly at different times. Brulé¹⁰ gives the ratio of urea-N to total-N as 0.82 to 0.95 in health. It will fall in liver disease. The residual nitrogen, which should be 0.10 per litre of blood, rises in liver disease to 0.20–0.25. The amino-acids in the urine will be increased in liver disease after giving 20 grm. of peptone.

II. Toxicopexic Function Tests.—

Phenoltetrachlorphthalein Test.—This test was first introduced by Rowntree and Abel in 1909: 150 mgrm. of drug are injected intravenously, and the amount excreted in a given time is noted. The drug may be recovered either in the bile (by using the duodenal tube), in the stool (not reliable), or in the blood (Rosenthal¹² and others). In the last-named case, samples must be drawn in $\frac{1}{4}$ hour, in 1 hour, and in 2 hours. In Piersol's series of 50 cases,¹¹ the maximum output of dye in the bile is in 11.6 minutes, and amounts to 22.4 mgrm. in health. In disease of the liver the appearance may be delayed twice as long, and only 2.71 mgrm. may be recoverable. Piersol and Bockus regard the test as of value.

Fig. 69.—Phenoltetrachlorophthalein test for liver function. Curves obtained in cirrhosis of the liver: Case 26, atrophic cirrhosis—no dye present in a twenty-four-hour sample; Case 27, cirrhosis in child, probably Hanot type; Case 28, hypertrophic cirrhosis—Curve B obtained three weeks after Curve A.

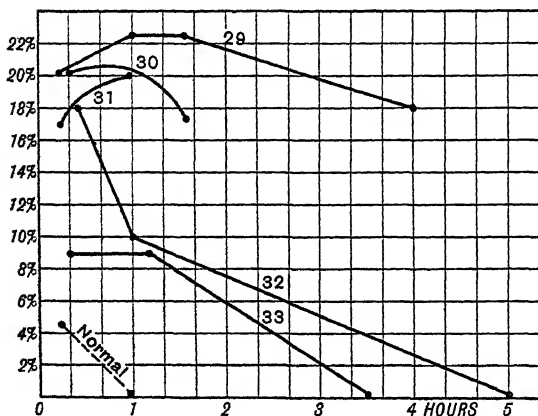
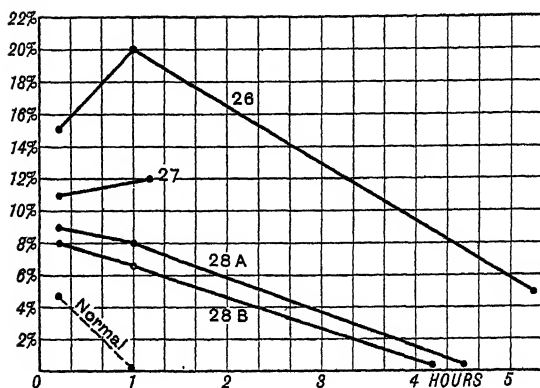
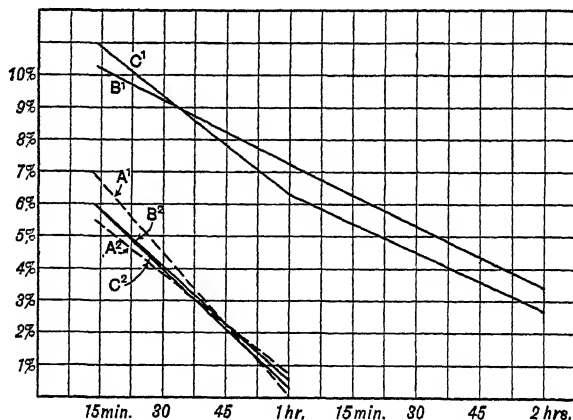


Fig. 70.—Phenoltetrachlorophthalein test for liver function. Miscellaneous liver diseases: Case 29, acute hepatitis, etiology unknown; Case 30, acute hepatitis following arsphenamine; Case 31, cholangitis, probably acute hepatitis (faint trace of dye present in twelve-hour sample); Case 32, solitary liver abscess; Case 33, chronic passive congestion—degenerative changes in liver. (Figs. 69 and 70, after Rosenthal, 'Jour. Amer. Med. Assoc.', 1922, Dec., 2151.)

Fig. 71.—Phenoltetrachlorophthalein test for liver function. Composite curves: A¹ normal curve for non-pregnant patients; A², curve in normal pregnancies; B¹, curve in cases of toxic vomiting; B², curve in same cases as B¹, after relief of symptoms; C¹, curve in cases of hypertension, including pre-eclampsia and eclampsia; C², curve in same cases as C¹, after relief of symptoms. (Fig. 71, after Rosenfield and Schneiders, 'Jour. Amer. Med. Assoc.', 1923, March, 743.)



There is much retention in pregnancy toxæmia, including eclampsia (Rosenfeld and Schneiders¹³).

Figs. 69, 70, 71 show some of the results obtained.

Camphor Test.—If $7\frac{1}{2}$ gr. of camphor are given by the mouth, it should cause glycuronic acid to appear in the urine. It will not do so in hepatic disease. E. G. Dodds¹¹ speaks favourably of the test.

Sodium Salicylate Test.—Roch¹⁰ gives $\frac{1}{2}$ gr. sodium salicylate, and tests the urine at intervals with ferric chloride. If the salicylic acid becomes glycuronic acid, the urine will not become blue.

Methylene Blue Test.—In this test, 2 mgrm. are given before breakfast, and the urine is tested every 4 hours for 12 hours. If the liver is deficient, the urine will become green from the fifth to the ninth hour.

III. The Chromopexic Function.—This function is studied especially in jaundice cases.

*Van den Bergh's Test.*¹⁵—This consists in adding two volumes of Ehrlich's diazo reagent (sulphanilic acid) to one volume of serum. If a violet colour appears, there is obstructive jaundice; but if the violet be obtained only after extracting the serum with alcohol, it is either hæmolytic or catarrhal jaundice. (There are further details in actual practice.) The theory is that the bilirubin of the bile is formed in the liver-cell out of a substance which is united to protein, as shown in *Fig. 67*. Fully-formed bilirubin should not be present in the blood. But where the liver-cell is incompetent, the pre-bilirubin accumulates and a colour reaction will appear (the alcohol removes the protein mask from the pigment). Andrewes¹⁴ does not attach much value to the test. McNee¹⁶ has published a full report on the subject.

A Test for Bile Salts in the Duodenum may be performed by giving 50 grm. butter as a test-meal, and then making an ultramicroscopic examination of the blood $1\frac{1}{2}$ hours later. If there is no biliary obstruction, the blood will become full of fat, whose particles are readily visible. Total biliary obstruction results in the appearance of hardly any globules at all (Brulé¹⁰), because there is no longer the requisite for emulsifying the fat.

IV. The Cholaligenic Power.—

Blood-cholesterol Test.—The cholesterol of the blood is derived from the food, and is partly converted in the liver into cholalic acid, the chemical nucleus of the biliary acids. Since the bile acids are necessary not only for the digestion of fat, but also to help the cholesterin out into the bile (Grigaut and Klinkhart), deficiency of cholaligenic power may be indicated by an increase of blood-cholesterol. Deficiency of cholaligenic function enables gall-stones to appear. The normal average is 0.160 per cent.

There is a marked fall in the blood-cholesterol after operations on the gall-bladder and gall-stones, because the substance now largely passes out the correct way. In toxic jaundice, where the liver substance is greatly damaged, the cholesterol increases greatly in the liver, but diminishes in the blood.

V. Glycopexic Function.—

The Levulose Test.—This is regarded as useful by Langdon Brown,¹⁷ but not by Langmead.¹⁸ As different persons vary much in their tolerance for the various sugars, and as the liver is not the only organ concerned in sugar metabolism, it cannot be regarded as entirely satisfactory. Chauffard and Cavasse laid much stress on the intermittence of output of glucose when the liver function is deficient.

Diastase Test.—This test is of value rather for pancreatitis than for liver disease. Harrison,¹⁸ Griffiths, and Langdon Brown all agree as to the value in acute pancreatitis. The amount may reach 300 to 500 units in acute cases. The amount of increase is proportional to the amount of pancreas which is damaged.

It is supposed that the diastase comes from the liver, whilst the pancreas controls the amount liberated. But it has been found that the blood does not give a low diastase value in cases of cirrhosis.

VI. The Adipopexic Power.—

Lipase Test.—The power of the blood to split up ethyl butyrate is increased in liver disease. Langdon Brown points out that the amount of liver disease must be very great before it will give this reaction. McNee⁶ is satisfied with the test, but Mackenzie Wallis¹⁸ believes it to be really a test of renal function. The urine may be examined for lipase instead of examining the blood.

REFERENCES.—¹*Presse méd.* 1922, Dec. 13, 1073; ²*The Antiseptic*, 1923, Sept., 433, and *Practitioner*, 1923, June, 442; ³*Med. Press*, 1923, June 20, 496; ⁴*Munch. med. Woch.* 1923, June 1, 697; ⁵*Paris méd.* 1922, Sept. 30, 281; ⁶*Jour. Amer. Med. Assoc.* 1923, March 3, 613; ⁷*Wien. klin. Woch.* 1923, June 28, passim; ⁸*Ibid.* 465; ⁹*Munch. med. Woch.* 1922, Dec. 22, 1753; ¹⁰*Recherches sur les Ictères*, Masson & Cie., Paris, 1923; ¹¹*Arch. of Internal Med.* 1923, March, 623; ¹²*Johns Hop. Hosp. Bull.* 1922, 1922, Dec., 432, and *Jour. Amer. Med. Assoc.* 1922, Dec. 23, 2151; ¹³*Jour. Amer. Med. Assoc.* 1923, March 17, 743; ¹⁴*Brit. Med. Jour.* 1923, i, 467; ¹⁵*Der Gallenfarbstoff im Blute*, Leiden, 1918; ¹⁶*Quart. Jour. Med.* 1923, July, 390; ¹⁷*Brit. Med. Jour.* 1923, i, 461; ¹⁸*Ibid.* 467; ¹⁹*Rev. méd. de la Suisse rom.* 1922, xlii, 291.

LUNG, ABSCESS OF. (See also THORACIC SURGERY; TONSILS, DISEASES OF.)

W. H. Wynn, M.D., F.R.C.P.

Moore¹ discusses the occurrence of lung abscess after operations on the upper respiratory tract. Of 508 laryngologists who replied to a questionnaire, 364 reported no lung abscesses and 144 reported a total of 202 cases. He concludes that the vast majority were of inspiratory origin, because of the time of development and the involvement of the lower lobe in 60 per cent (right in 41 per cent, left in 19 per cent), which is about the same relative incidence as in cases of inspired foreign bodies. Pulmonary abscess occurred once in 2500 to 3000 tonsillectomies. He regards infection through the bloodstream or lymphatics as rare. Whittmore,² in a series of 86 cases, found that 61 per cent were preceded by operations on the upper respiratory tract under general anaesthesia, 40 per cent being after tonsillectomy. Fisher and Cohen³ collected 76 cases after tonsillectomy, and in all but 2 under ether anaesthesia. They quote statistics showing that local anaesthesia is not followed by complications for the following reasons: (1) It removes the possibility of aspirating infective material; (2) It produces a marked constriction of the lymph and blood channels in the field of operation, thus preventing infective thrombi; (3) It reduces general shock; (4) It cannot light up a quiescent lesion in the respiratory tract. Bronchopneumonia is the next most common cause of lung abscess, lobar pneumonia seldom being followed by abscess. Inhalation of foreign bodies, septic infarcts, and extension of suppuration from subdiaphragmatic and mediastinal abscess may also cause pulmonary abscesses.

The onset of post-operative abscess is acute, with pain in the chest, a rise of temperature, and in a day or two signs of pneumonia. The fever becomes intermittent, and the sputum increases in amount and may or may not be fetid. It may range in amount from half an ounce to half a pint in twenty-four hours. Streptococci, pneumococci, staphylococci, and influenza bacilli are the commonest organisms, with sometimes anaerobic bacilli. Elastic fibres are strong evidence of an abscess, but are not always found. X-ray examination will show the exact localization of the abscess and help to differentiate it from bronchiectasis; but the latter disease is one of gradual development and less marked general symptoms.

TREATMENT.—Homans⁴ advises that within the first few weeks treatment should be by Postural Drainage, Hygienic Surroundings, and Antiseptic Inhalations, and that this treatment should be followed so long as the general

condition and lung signs improve. When an abscess becomes chronic, **Operation** is the only measure likely to cure. A delay of several months is not necessarily prejudicial. Whittemore advises operation if there is not improvement in three or four weeks. The recoveries under expectant treatment seem to be about 10 per cent, and the mortality 50 to 60 per cent. The immediate operative mortality is about 10 to 15 per cent, but even after operation about half the patients remain with chronic suppuration. The prognosis is worse with the post-pneumonic than the post-operative cases.

Better results are obtained by **Artificial Pneumothorax**. Rich⁵ records 10 cases, 2 of which recovered spontaneously and 8 were treated by artificial pneumothorax; of these, 2 died and 6 made a complete recovery. He regards the best time for treatment as between the second and fourth weeks. Peripheral abscesses are not suitable for this treatment, as perforation into the pleural cavity is likely. Abscesses near the hilum are the most suitable. In acute cases compression should be maintained for at least four weeks, and in chronic cases much longer. Perkins and Burrell⁶ advocate artificial pneumothorax as a routine procedure in lung abscess, which may be sufficient in itself and, where not, will enable the patient to face the more severe operation. They report 7 cases, with complete recovery in 6.

REFERENCES.—¹*Jour. Amer. Med. Assoc.* 1922, lxxviii, 1279; ²*Boston Med. and Surg. Jour.* 1923, April 5, 497; ³*Jour. Amer. Med. Assoc.* 1921, lxxvii, 1313; ⁴*Boston Med. and Surg. Jour.* 1923, April 19, 577, ⁵*Amer. Jour. Med. Sci.* 1922, Sept., 428; ⁶*Lancet*, 1923, i, 478.

LUNG DISEASES, THE VITAL CAPACITY TEST IN.

W. H. Wynn, M.D., F.R.C.P.

During the last few years the vital capacity test, together with certain measurements of the body from which physical fitness is ascertained, has attracted much interest. Myers¹ has carefully investigated the vital capacity test in diseases of the lung. The following summarizes his observations:—

Pneumonia.—(1) Twenty patients were examined. (2) The lowest vital capacity taken was 17 per cent of the normal: this occurred in one case on the fifth and sixth days. The highest reading was 83 per cent of normal: this occurred in another patient on the day of discharge. (3) There was very little relation between the extent of lung involved and the reduction of vital capacity. (4) There is probably no other acute disease of the respiratory tract which so reduces vital capacity from the beginning as pneumonia. (5) During the period of convalescence the vital capacity test offers much information on the clearing up of the lesion. An unresolved condition or a complication is shown by a failure of the vital capacity to increase. (6) The vital capacity is of great value in guiding the patient's activities; every patient should remain reasonably inactive until the vital capacity is 90 per cent of the normal.

Asthma.—(1) Twenty cases were examined. (2) The vital capacity was greatly reduced during acute attacks: in some cases to from 18 to 20 per cent of normal. (3) After acute attacks subsided, the vital capacity returned to normal in all cases except four with emphysema and three beyond the age of 80.

Pulmonary Tuberculosis.—(1) Vital capacity readings were made in 335 suspected cases; stereoscopic X-ray plates were made in 210. (2) In 30 cases in which the plates showed no signs of disease the mean vital capacity was 102 per cent of normal, while the range was between 82 and 122 per cent. (3) Peribronchial tuberculosis was present in 39. The average vital capacity was 97 per cent, and the range from 81 to 121 per cent. (4) There were 71 cases with unilateral and 70 cases with bilateral parenchymatous disease. The cases were grouped according to the extent of disease. The vital capacity was found to decrease with the extent of the disease. (5) Pulmonary cavities were shown

in 30. The mean vital capacity in these was 64 per cent, and the range from 31 to 109 per cent. (6) Nine cases had pneumothorax, spontaneous or artificial. The mean vital capacity was 49 per cent, and the range from 32 to 58 per cent.

Orthopnoea.—Christie and Beams² hold that there will not be genuine orthopnoea without a great reduction of vital capacity, the most common cause of which is cardiac disease, though it may be reduced greatly in pulmonary tuberculosis, pleurisy with effusion, intrathoracic tumours, asthma, and paresis of the muscles of respiration. They have studied the vital capacity in 290 normal subjects and 42 with reduced vital capacity from disease. They found that in 80 per cent of normal subjects there is 5.5 per cent less vital capacity when lying than when sitting. In 20 per cent the vital capacity remains unaltered. Normal persons of the same sex and same body surface have practically the same vital capacity. Orthopnoea occurs when disease has caused a very severe reduction in vital capacity. A patient with severe cardiac disease may have a vital capacity when sitting upright which has been reduced from 4000 c.c. to 1000 c.c. He has therefore only 25 per cent of his vital capacity. If he lies down there is a further reduction by 5.5 per cent of 4000 c.c., that is, 220 c.c.; this lowers the vital capacity to 780 c.c., which is quite inadequate for his needs. Without a severe reduction in vital capacity orthopnoea will not occur, but other factors, such as cough, fever, restlessness, which cause an increase in the metabolic rate, will increase the severity of the orthopnoea. The authors subdivide orthopnoea into (1) orthopnoea of choice, (2) orthopnoea of necessity, the difference being one of degree. The former is the more common; the patients prefer to sit up, but it is not essential to their well-being. The patients notice the reduction in vital capacity on lying down and become apprehensive. With 'orthopnoea of necessity' the patients sit up for self-preservation to take advantage of every available cubic centimetre of vital capacity. Some patients with a great reduction of vital capacity as is seen in 'orthopnoea of necessity' do not become orthopnoeic. They are probably like the 20 per cent of normal cases whose vital capacity was unchanged when they lay down.

REFERENCES.—¹*Arch. of Internal Med.* 1922, Nov., 648; ²*Ibid.* 1923, Jan., 85.

LUNG, GANGRENE OF.

W. H. Wynn, M.D., F.R.C.P.

Evidence is accumulating that gangrene of the lung may be caused by the aspiration of spirochaetes and fusiform bacilli in dental caries. Kline¹ reports three cases of gangrenous ulceration of bronchi and lung associated with dental caries and gingivitis, the exudate showing numerous fusiform bacilli and spirochaetes. Curschmann² advocates the use of *Arsphenamine*. The mortality under medical treatment was formerly 75 to 80 per cent, but since the advent of arsphenamine 9 cases have been reported completely cured and 4 materially improved. In 4 other cases no benefit was obtained. He describes a case of rapidly progressive gangrene following pneumonia which was arrested and the lung completely healed in thirty-six days with a total of 1.35 gm. of *Neo-arsphenamine*. In a case of fortid bronchiectasis in a man of 71, great improvement followed a course of 4 gm. of neo-arsphenamine in six weeks. The gangrene in these cases was of bronchial, not embolic, origin, and in none was the fuso-spirillar combination found. The embolic form of pulmonary gangrene, of which the chief cause is *Streptococcus putridus*, is not suitable for salvarsan treatment, and is best dealt with by operation; but the diffuse bronchogenous gangrene is unsuitable for operation, and salvarsan should be used. *Antigangrene Serum* has been advocated by other authors, either alone or in conjunction with Artificial Pneumothorax, Salvarsan, or Tincture of Garlic.

REFERENCES.—¹*Jour. Amer. Med. Assoc.* 1921, LXXVII, 1874; ²*Ibid.* 1922, Dec. 23, 2200

LUNG, HYDATID DISEASE OF.*W. H. Wynn, M.D., F.R.C.P.*

Hydatid cysts of the lung are rare in this country. Jewesbury¹ reports a case in a boy of 8, and states that at St. Thomas's Hospital, London, 21 cases of hydatid disease occurred in fifteen years, only two of which affected the lung. Halahan,² of Buenos Aires, describes five cases. He points out that whilst a hydatid cyst of the liver may exist for a long time and grow to an enormous size without much affecting health, a hydatid of the lung gives rise to severe symptoms almost from its beginning. The most constant symptom is hæmoptysis, and next in importance is a dry hacking cough. Rupture into a bronchus is a frequent result which may be fatal. It is shown by violent fits of coughing, cyanosis, urgent dyspnoea, and hæmoptysis. There is watery expectoration in which bits of membrane, daughter cysts, and hooklets can be found. The cyst then becomes infected and the sputum purulent. Fever follows, with great wasting, pigmentation, and dryness of the skin. Should rupture into the pleura take place, the symptoms resemble a pleural effusion or empyema. Physical signs vary with the size and position of the cyst; most cases are right-sided. An eosinophilia may be present in the blood, and serum diagnosis may be positive. A small cyst may not be seen by X rays, but a larger one shows a circular, well-defined shadow which, if examined at intervals, shows a progressive increase in size. Exploratory puncture is dangerous, and death follows very frequently, either from massive absorption of toxic products in a sensitized patient, from secondary infections, rupture into bronchi or pleura, or pulmonary oedema. Surgical intervention offers the best chance of cure. Extensive Resection of Ribs followed by removal of the endocyst and free drainage has given good results in many cases.

REFERENCES.—¹*Proc. Roy. Soc. Med.* 1922, xv, 32; ²*Surg. Gynecol. and Obst.* 1923, March, 354.

LUNG, PRIMARY CARCINOMA OF.*W. H. Wynn, M.D., F.R.C.P.*

Barron¹ in 4362 autopsies found 13 cases of primary carcinoma of the lungs. The condition occurred three times as frequently in males as in females. The highest incidence was in the sixth decade. He considers that inflammatory conditions, especially tuberculosis, are the chief predisposing factors, and that the recent influenza epidemic may account for the striking recent increase in cases. Grossly the tumours may be classified as (1) nodular, (2) diffuse or lobar, and (3) infiltrating. They vary greatly in size, and occasionally are so small that symptoms are caused only by the metastases. The upper lobe of the right lung is the commonest site. Histologically the cylindrical-celled growths are the most common. The symptoms may be so variable as to cause much difficulty in diagnosis. Cough is frequent and early, and pain is usually present. Dyspnoea and cachexia are late symptoms. Fever is not uncommon because of inflammatory complications. In many of the cases tuberculosis was at first diagnosed. Regarding treatment, Barron writes: "Most of the tumours are located at the hilum of the lung in close proximity to the cardiac space, and also directly in the region of the pulmonary vessels. In a few cases excision has been attempted, but the results are disappointing. Röntgen and radium therapy have so far proved of little or no value."

Moise,² who records five cases of primary carcinoma, states that, according to statistics up to 1917, carcinoma of the lung was found in 0.36 per cent of necropsies and in 1 per cent of all carcinomata. He also finds a real increase in the incidence of pulmonary carcinomata, and suggests a causal relation to the severe damage to the bronchial and alveolar epithelium caused by influenza.

REFERENCES.—¹*Surg. Gynecol. and Obst.* 1922, Sept., 190; ²*Med. Science*, 1923, April, 15 (abstr.).

LUNG, SURGERY OF. (*See* THORACIC SURGERY.)**LUNG, SYPHILIS OF.***W. H. Wynn, M.D., F.R.C.P.*

PATHOLOGY AND SYMPTOMS.—The literature on syphilis of the lung is confusing, and there is no unanimity as to its frequency, symptoms, or morbid anatomy. Friedlander and Erickson¹ describe 6 cases, and Bryce and Patterson² have analysed the clinical data of 32 patients and give the results of a careful examination of the lungs post mortem in 18 cases showing other signs of syphilis, 5 of whom were known to have a pulmonary lesion during life. Both papers give an excellent summary of the pathology and symptoms. Cases fall roughly into two groups: in one the signs and symptoms tend to resemble those of pulmonary tuberculosis, in the other they suggest an intra-thoracic neoplasm. These types can be correlated with the underlying pathological condition: in the former there is mainly peribronchial and perivascular fibrosis, in the latter a gummatous and fibrotic condition spreading from the hilus. A secondary bronchiectasis is common, and occasionally there are ulcerative and gangrenous lesions. Gummata may be single or multiple, and are most often found at the hilum or in the lower lobes. The softening of a gumma may produce cavities resembling those of tuberculosis. A low-grade inflammatory process with subsequent fibroid induration and bronchiectasis is possibly commoner than the gumma. Cases of syphilitic bronchitis with spirochaetes in the sputum have also been described. Bryce and Patterson show that syphilis causes changes of various degrees in the lungs in a considerable number of cases, but only when these are gross do they give rise to symptoms. When symptoms appear it is usually late in the course of the syphilis—from eight to twenty years after infection. There are no characteristic symptoms. Cough, hæmoptysis, dyspnoea, night sweats, loss of weight, and slight fever may all be present.

DIAGNOSIS.—The exclusion of tuberculosis is the greatest difficulty. Repeated failure to find tubercle bacilli in the sputum does not exclude tuberculosis, and the search must be conducted by modern methods of concentration of sputum and inoculation of guinea-pigs. A positive Wassermann reaction points to syphilitic infection, but even in the presence of lung signs does not warrant the diagnosis of lung syphilis. Friedlander and Erickson found 13 per cent of 791 patients in a sanatorium gave a positive Wassermann reaction, but they could only make the diagnosis of syphilis of the lung in 4. Confusion may also arise with neoplasms, hydatid, mediastinal tumour, and aneurysm. Clinically, syphilis of the lungs may be suspected if there is a slow course and long duration of symptoms, recurring hæmoptysis, evidence of fibrosis of the lungs and bronchiectasis, especially in the lower parts of the lungs, absence of tubercle bacilli in the sputum, a positive Wassermann reaction, and not much interference with the general health. When the diagnosis has been made, intensive antisyphilitic treatment is indicated. If under such treatment improvement in the general condition and in the local signs, together with a clearing of the X-ray shadows, occur, the diagnosis is confirmed; but in this connection it must be remembered that syphilis and tuberculosis may co-exist, and that with treatment the syphilitic process may be checked but the tuberculosis continue to be active.

REFERENCES.—¹*Jour. Amer. Med. Assoc.* 1922, July 22, 291; ²*Med. Jour. of Australia*, 1923, March 24, 316.

LUPUS ERYTHEMATOSUS.*E. Graham Little, M.D., F.R.C.P.*

Gardiner¹ describes a fatal case of lupus erythematosus in which he was able to obtain an autopsy, and it is of interest to note that the presence of acute tuberculosis as well as streptococcal infection was demonstrated. As is well

known, much controversy exists as to the causation of lupus erythematosus, the claims of the tubercle bacillus and the streptococcus being foremost at present. The author thinks that this disease may be the product of many causes. As regards treatment, septic foci should of course be sought and removed where possible. Salicin given internally is often followed by excellent results. Injections of Horse Serum are mentioned as having been useful in resistant cases, but dose and manner of giving are not specified.

REFERENCE.—*Edin. Med. Jour.* 1923, June, 233.

LUPUS VULGARIS. (*See SKIN DISEASES, GENERAL THERAPEUTICS.*)

LYMPHATIC GLANDS IN NECK, ENLARGED. (*See TONSILS, DISEASES OF.*)

MALARIA.

Sir Leonard Rogers, M.D., F.R.C.P., F.R.S.

EPIDEMIOLOGY.—C. A. Gill¹ records the success of a prediction regarding the prevalence of malaria in the Punjab based on a study of rainfall and other factors in 1921. A preliminary forecast submitted on July 1 stated that a high degree of susceptibility was widespread, and a final forecast made in September, when the July and August rainfall was known, said that no widespread epidemic need be anticipated, but the disease was likely to be in excess in the northern districts, and to a less extent in the south-eastern ones, together with slight excess in the south-western districts. All of these prophecies were fulfilled to a great extent by the malarial prevalence which occurred in the usual maximum month of October; but preparations had been made both for laboratory field work, and for an extra supply of quinine in the most affected area. This first forecast has thus given very encouraging results, which should be improved on with further experience.

F. W. Cragg² points out that the observations of Roubaud and others that the presence of cattle in a village may lessen malaria through the anopheles feeding mainly on those animals in preference to man may help to explain the epidemics of malaria in India after heavy rainfall following famine years leading to great loss of cattle. S. T. Darling³ records an instructive instance of the value of a spleen count in a Brazil village in indicating the source of infective mosquitoes. An examination of all the children in a school showed a spleen index of only 4 in the upper rows of houses, of 26 in the middle area, and of 74 in the lowest part of the village near a river, in the neighbourhood of which numerous breeding pools were found; while a likely looking stream running down through the middle of the village, but showing no relation to a high spleen index, was found to be free from anopheles. C. C. Bass⁴ discusses malarial control operations, and lays stress on drainage and filling operations, with clearing of forest, as the most permanently effective measures; these, however, are too expensive on a large scale for general use, except in the form of the gradual clearing of land for cultivation, while control by "infected persons taking proper quinine treatment does not involve any cost over the amount that would be expended on other remedies", so is generally applicable and should be emphasized by all malarial control agencies.

C. A. Bentley⁵ once more discusses the economic aspects of Bengal malaria, and emphasizes the decrease of the population in Western and Central Bengal owing to malaria due to prevention of the overflow of the deltaic rivers of this tract by high bunds. C. Strickland⁶ deals with a malarial survey of the Bombay State of Sawantwadi, and shows that the severe malarial prevalence in the villages on the mountainous ridges of the Western Ghats is due to the good breeding grounds for the dangerous malarial carrier, *A. maculatus*, formed by the escape of the subsoil water derived from the heavy rainfall on these mountains.

A. P. Ross,⁷ in opening a discussion on malaria in South Africa, described its distribution, which is very severe in certain low-lying swampy areas, and also causes summer epidemics in slightly higher regions, and considers that in the worst areas settlers should only be allowed if they adopt efficient antimalarial measures, such as screening and quinine prophylaxis; and Government control under acts already in force is also necessary in other malarious areas. H. A. Spencer⁸ also deals at length with malaria in the Transvaal, and points out the serious prevalence of the disease, which is greatly retarding the development of the country.

PATHOLOGY.—J. W. W. Stephens⁹ describes yet another supposed new variety of malaria parasite on the strength of carefully studied preparations from one case, as to which he at first was doubtful whether it should be classed as benign tertian or quartan; he describes it as a “non-amœboid, pigmented, compact, round or oval parasite, resembling quartan, in a red cell showing Schuffner’s dots, which is either normal in size or only slightly enlarged”.

J. A. Sinton,¹⁰ by examinations of malarial infected bloods after exposing the corpuscles to hypotonic and hypertonic saline solutions, supports the view of Mary Rowley-Lawson that the malarial parasite is situated on the surface of, and not within, the red corpuscle. The same worker¹¹ describes how to make and use special glass culture tubes for the parasites, which greatly reduce the manipulation and chance of contamination, and records successful cultures in 50 per cent of his early attempts and the last 12 consecutive cases of malignant tertian infections; he also mentions having used thermos flasks for incubating his tubes. Cases in which quinine has been taken are less successful. Sinton¹² also reports a possible fallacy of the thick-film method of search for malarial parasites due to flagellates in the water used for hæmolysing the films staining very like malarial parasites.

R. Knowles, H. W. Acton, and B. M. D. Gupta¹³ describe their findings in spleen puncture films from malarial cases, and found the method to be of no diagnostic value, as the parasites rapidly undergo degeneration in that organ, which they suggest is the main factor in spontaneous cures of malaria.

J. M. Swan¹⁴ analyses his results in 68 differential leucocyte counts in malaria, and finds the large mononuclear increase to over 10 per cent in 68.1 per cent; although it was not constant either in the acute stage or in carriers, its presence is a reasonable indication of recent malaria.

E. R. Whitmore¹⁵ has tested the effects of the ultra-violet rays of the quartz mercury lamp in producing relapses of malaria in canaries, and found fifteen minutes’ exposure sufficient if the breast feathers were removed. S. Adler¹⁶ examined thirteen chimpanzees in Sierra Leone for malarial parasites, and found two young ones to be infected with a parasite indistinguishable from *P. falciparum*.

TREATMENT.—R. N. Chopra¹⁷ publishes a general account of the therapeutics of *Cinchona Alkaloids*, including Acton’s work dealt with in previous issues of the MEDICAL ANNUAL, and the pharmacological action. He considers 30 gr. of quinine daily by the mouth sufficient, and in very severe and cerebral cases advises 10 to 15 gr. of the bihydrochloride intravenously in 20 c.c. normal saline, taking at least five to ten minutes over the injection. For prophylaxis 10 to 15 gr. of quinine should be given daily as long as the wet-bulb thermometer reads between 18° and 22° C. M. M. Dutt¹⁸ records physiological studies on quinine, and found the hydrochlorides most active against paramœcia, while his results on excretion in the urine closely agreed with those of Ramsden and Lipkin. Experiments on rabbits showed the order of most rapid absorption was the hydrochlorides, the bisulphate, and, lastly, the sulphate; the blood-pressure was little affected except by intravenous injection, and he agrees with

U. N. Brahmachari¹⁹ in advising diluting the dose with 100 c.c. of saline, preceded by 1 c.c. of pituitrin in 100 c.c. of saline and ending with 50 c.c. of the same solution : a complicated and time-consuming method.

J. A. Sinton²⁰ records a trial of alkalis in addition to quinine, giving Sodium Bicarbonate 60 gr., Sodium Citrate 40 gr., in 1 oz. of water thrice daily, and a preliminary purge of Magnesium Sulphate; he suggests dissolving the quinine in citric instead of sulphuric acid. He reports 72 per cent of cures of benign tertians, against 20 per cent Acton obtained with quinine, but no material difference in a small series of malignant tertian cases. C. C. Bass²¹ records that cultures containing the equivalent of 2 grm. of quinine in the blood of a 150-lb. man prohibited the growth of malarial parasites, which degenerated in about twenty-four hours. The same writer²² has found the standard treatment of malaria recommended by the National Malaria Committee to be reliable : namely, 10 gr. of sulphate of quinine orally three times a day for four days, which will always stop the fever of any malarial attack; it is followed by 10 gr. every night for eight weeks.

F. Nunes²³ records his experience of the treatment of over 8000 cases of malaria in an unhealthy part of Colombia, during which he tried various methods, and advises Calomel 5 gr. with Quinine 15 gr., and eight hours later a full dose of magnesium sulphate, followed by 0.45 to 0.75 grm. of Neo-arsphenamine (914) in 10 c.c. water intravenously on the first day, then 10 gr. of quinine three times a day for one week, and then 10 gr. daily for a further seven weeks in acute cases; while in chronic relapsing cases he gives 0.45 grm. of 914 every week for two to six injections, 10 gr. quinine daily, plus 80 gr. a day on two consecutive days each week for two months. In pernicious cases he gives 15 gr. of the bihydrochloride intravenously in 10 c.c. water, followed by the same dose intramuscularly every twelve hours until the patient is able to take the drug by the mouth without sickness. In cases of quinine intolerance, 0.5 gr. of colloidal quinine in the form of Dausse's 'Colobiasés de Quinine' in 2 c.c. of 10 per cent gum-acacia are injected intravenously. Iron, arsenic, and colloidal manganese and iron are useful tonics.

REFERENCES.—¹*Ind. Jour. Med. Research*, 1923, April, 1136; ²*Ibid.* 962; ³*Jour. Amer. Med. Assoc.* 1923, March 17, 740; ⁴*Ibid.* 1922, July 22, 277; ⁵*Ind. Med. Gaz.* 1922, Sept., 321; ⁶*Ibid.* 1923, Jan., 7; ⁷*S. African Med. Jour.* 1922, Dec. 9, 450; ⁸*Ibid.* 1922, Sept. 19, 242, and 1923, Jan., 3; ⁹*Ann. Trop. Med. and Parasitol.* 1922, Dec., 383; ¹⁰*Ind. Med. Gaz.* 1922, Oct., 367; ¹¹*Ind. Jour. Med. Research*, 1922, July, 203; ¹²*Ibid.* Oct., 592; ¹³*Ind. Med. Gaz.* 1923, May, 211; ¹⁴*Amer. Jour. Trop. Dis.* 1922, July, 283; ¹⁵*Ibid.* Sept., 475; ¹⁶*Ann. Trop. Med. and Parasitol.* 1923, April 18, 13; ¹⁷*Ind. Med. Gaz.* 1922, Nov., 401, and Dec., 441; ¹⁸*Calcutta Med. Jour.* 1922, Nov., 201; ¹⁹*Lancet*, 1922, ii, 175; ²⁰*Ind. Jour. Med. Research*, 1923, Jan., 850; ²¹*Amer. Jour. Trop. Med.* 1922, July, 289; ²²*N. Y. Med. Jour.* 1923, June 20, 740; ²³*Amer. Jour. Trop. Med.* 1923, July, 269.

MANIC-DEPRESSIVE INSANITY.

C. Stanford Read, M.D.

Two hundred and twenty-four families, with some 1183 members, of whom 236 were patients, were studied by Wimmer¹ from the point of view of hereditary transmission. He concludes that in all probability the condition is an hereditary mental affection, with heredity similar and direct: in Mendelian terms, it is dominant, but complexly so; in the families affected by it dementia præcox is not found.

A symposium² on manic-depressive psychoses illustrates the view-points of some American psychiatrists. Kirby states that he has found psychological treatment on the conscious level beneficial with cases apparently precipitated by external circumstances that could be modified, but of little value where constitutional tendency was marked. Pierce Clark said he had more or less completely analysed over a dozen cases, and in none had there been a relapse.

All were long-standing and had had many attacks. He thinks the best period for analysis is just before or after a depression, superficial analysis being continued during the depressed period. He considers that the manic-depressive group have a less deep-rooted grasp on the foundations of life than the epileptic, and that their explanation of the cure is, either from repression of the unpleasant or from personality defects, cruder than that of other analytical cases. Cotton repeated his views, which are detailed elsewhere. Jelliffe also dealt with these psychoses on psycho-analytical lines, and thought their root difficulties seemed to lie between the upper narcissistic and lower social levels (taking the psychosexual stages as archaic, organ erotic, narcissistic, and social). An attack he regards as conditioned by graduated loss of libido object, the ego being wounded at the homosexual level.

Hans Schmitz³ quotes a group of cases which he brings together under the title "Monosymptomatische Melancholie". They are all cases in which the underlying melancholia was masked by some organic disorder localized in the stomach or the sex function. He maintains that on account of this apparent localization the real psychological condition was overlooked. The diagnostic attitude accountable for such blindness as this will permanently survive as long as the physiological standpoint is allowed to ignore obvious psychological facts.

REFERENCES.—¹*L'Encephale*, 1922, xvii, 129; ²*Jour. of Nerv. and Ment. Dis.* 1923, Feb.; ³*Munch. med. Woch.* 1923, March 30.

MASTOID DISEASE. (See EAR.)

MEASLES.

J. D. Rolleston, M.D.

SYMPTOMS AND COMPLICATIONS.—G. N. Malmberg¹ investigated the *diazo-reaction* in 33 measles patients, with the following results: (1) A positive reaction was found in 24 cases, or 73 per cent. The duration of the reaction ranged from half a day to eight days; as a rule the reaction remained positive three or four days. (2) A positive reaction usually occurred two to four days after the appearance of the eruption; in only two cases did it occur at the same time as the eruption, and it never preceded it. (3) The date of appearance of a positive reaction and of its greatest intensity usually coincided with the fall of the temperature. A positive reaction was very frequently found associated with a normal temperature. (4) A distinct connection was shown to exist between the number of leucocytes in the blood on the one hand and the diazo-reaction on the other, a fall in the number of the leucocytes or a low count coinciding with a positive reaction, and a rise in the number of the leucocytes accompanying the disappearance of the reaction.

Cases illustrating the *disappearance of Widal's reaction in measles* are reported by W. Forche,² whose first case occurred in a boy, age 8, who had an attack of typhoid fever with a positive Widal's reaction. Six days later he developed the eruption of measles, and on the following day the reaction was found to be negative, becoming positive again a fortnight later. In order to determine the condition of Widal's reaction in other cases, he inoculated ten more measles patients with typhoid vaccine and examined their blood six days later, with the following results: In four there was an agglutination of 1-40 and in six there was no agglutination at all, while out of seven controls all but one, an atrophic infant with pneumonia who gave a negative reaction, were strongly positive. This disappearance of Widal's reaction with the onset of measles may be compared with the disappearance of the tuberculin reaction in measles, and seems to indicate a weakening of the general cellular and humoral resistance of the system as the result of the acute infection.

E. Apert and R. Broca³ report a case of obstinate urticaria of eight months' duration which was suspended for twenty days by an attack of measles, as it disappeared for ten days before and for ten days after the occurrence of the measles eruption. As the usual incubation period of measles is fifteen days, the urticaria disappeared five days after infection. It was remarkable to find measles interfering with the appearance of urticaria, as urticaria may develop as a serum rash after prophylactic injection of diphtheria antitoxin, or may occur apart from injection of serum as a prodromal rash.

F. Bindi⁴ records a case of *necrosis of the metatarsal bone* of the left hallux which developed a fortnight after measles in a girl, age 10. Numerous streptococci were found on examination of the pus. Complete recovery followed removal of the bone.

Bindi refers to a case of necrosis of the upper jaw following measles which he had previously described, and one of gangrene of the soft tissues reported by Antonucci in 1907.

R. Fica⁵ reports a case of measles followed by very acute *serous meningitis* in a girl, age 16. Two days after recovery from a typical attack of measles the patient suddenly developed a temperature of 104°, became semi-conscious, and presented opisthotonos, Kernig's sign, and a slow pulse. Lumbar puncture gave issue to 30 c.c. of clear fluid under high tension. There was no lymphocytosis, the Nonne-Apelt and Boveri reactions were negative, and the amount of sugar and albumin in the cerebrospinal fluid was normal. Improvement set in after a second lumbar puncture, and recovery took place in ten days.

J. F. Heinert⁶ records two cases of *amaurosis* in measles, one in a boy, age 4, in whom loss of vision lasted thirty-six hours and was attributed to a local vascular spasm, and the other in a boy, age 3, in whom the blindness persisted for nearly twenty-four days. Nothing was found to account for the condition in the fundi or media of the second case, the only one in which an ophthalmoscopic examination was made.

PROPHYLAXIS.—C. Nicolle and E. Conseil,⁷ who were the first to employ the prophylactic injection of *Convalescent Serum* in measles (*see* MEDICAL ANNUAL, 1919, p. 229; 1921, p. 307; 1922, p. 262; 1923, p. 273), state that the serum should be collected between the sixth and tenth day, after the temperature has become normal. When kept in the ice chest it retains its prophylactic properties for at least two years. The few failures that have occurred with this method have probably been due to the feeble prophylactic power of a particular serum or to the injection of too small a dose. It is therefore advisable to use a mixture of serums, and to inject at least 10 c.c. The duration of the immunity conferred is uncertain, but it may not exceed a few weeks. Nicolle and Conseil have recently employed a method of *Sero-vaccination*, which consists in the injection of 10 c.c. of convalescent serum, and, twenty-four hours later, of 1 c.c. of the blood of a measles patient in the acute stage. The method is harmless, and the immunity conferred by this method is probably more lasting than that conferred by the injection of convalescent serum alone.

C. Herrman⁸ remarks that the chief objection to the prophylactic inoculation with convalescent serum is that it confers a *passive* immunity, which lasts only about eight weeks, and that this immunity is not absolute, as out of 637 inoculations performed by various clinicians, 38, or about 6 per cent, failed to protect. Moreover, the method has only a limited application, viz., in institutions for the care of infants and young children, where on the occurrence of a case of measles the remaining children can be given a prophylactic injection. Herrman has devised a method to convert the temporary relative immunity possessed by infants during the first six weeks of life into an

immunity lasting during the first few years of life, when the disease is most dangerous.

The technique is as follows: The nasal mucous discharge of measles patients free from other diseases is taken from twenty-four to forty-eight hours before the appearance of the eruption, mixed with a small quantity of saline solution, and bacteria and other extraneous material separated by centrifugalization. A little tricresol is added as a preservative, and a few drops of the solution are then applied to the nasal mucous membrane of the infant to be immunized. Only healthy infants between 4 and 5 months old should be inoculated. The best results were obtained when there was some reaction following inoculation, such as a slight rise of temperature from the eighth to the sixteenth day, or a few spots on the body. Of 165 infants who had been inoculated, none showed any unfavourable effects; 75 of these had been followed from four to eight years, and only 5 of these had contracted measles. Of the remaining 70, 45 had been exposed directly to measles infection in the same family or house. In 84 of the 165 there was a definite reaction and rise of temperature, with or without spots on the face and body, and none of these 84 cases developed the disease.

R. Debré and J. Ravina⁹ found that by injecting 2½ to 3 c.c. of the serum of measles convalescents at the end of the incubation period a modified form of the disease was produced, presenting the following characters: The catarrhal symptoms were either completely absent or consisted only of a slight nasal discharge. Koplik's spots were always absent. The temperature did not exceed 100·4°, and in some cases was not raised at all. The eruption was either very discrete, consisting of a few macules usually on the trunk and exceptionally on the lower limbs, or was generalized and quite typical. But the most striking feature of the cases was the relative intensity of the rash and the absence of any catarrh or any constitutional disturbance. No case had any complications. In one case the tuberculin cuti-reaction remained positive, though slightly attenuated, throughout the disease.

TREATMENT.—While Debré and Ravina⁹ found that, when once the disease had developed, injection of convalescent serum did not have any favourable effect, Méry, Gastinel, and Joannon¹⁰ found that in malignant measles, in which the gravity of the condition is due to the virus of measles itself, the use of **Convalescent Serum** was very beneficial, although it did not prevent the occurrence of such complications as bronchopneumonia or otitis, which are due to secondary infection.

P. Galli¹¹ treated 15 children of both sexes, age from 2 to 16, with **Calcium Chloride** in doses of 1 to 2 grm., according to age, for three or four days before the appearance of the eruption. In all the cases the drug appeared to exercise a beneficial effect upon the disease, as the attacks were invariably mild. Galli does not think that this effect was due to the character of the epidemic, as the child who gave rise to the infection came from a district in which there were several severe cases. He thinks that if administered early, when the production of specific toxins is only just beginning, calcium chloride has a coagulating and neutralizing effect upon the proteins which are invading the organism, and thus renders the course of measles shorter and milder than usual.

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MEDIASTINUM, TUMOURS OF. (See THORACIC SURGERY.)

MEDICO-LEGAL POINTS OF INTEREST. *Joseph Priestley, B.A., M.D., D.P.H.*

Heart Failure as an Accident under the Workmen's Compensation Act.—On appeal, the decision of a Pontypool County Court judge was upheld to the effect that heart failure, brought about by heavy work (sweeping away of snow) carried out under very severe climatic conditions, was an accident arising out of, and in the course of, a miner's employment. Post-mortem examination failed to reveal any trace of anything to cause the heart failure.

The Microspectroscope in the Detection of Blood.—This instrument provides a very delicate test for blood-stains. The characteristic two absorption bands of oxyhæmoglobin appear even though an infinitesimal portion only of blood-stain solution is examined, and a control experiment with a small droplet of a solution of *fresh* blood is always available for comparison. If the blood-stain is reduced with ammonium sulphide solution, the spectrum of hæmoglobin appears, and the spectrum of hæmochromogen could then be obtained by treating the stain with solution of potassium hydroxide—still using the control experiments with a small droplet of a solution of *fresh* blood. A very old blood-stain would give the spectrum of methæmoglobin, and even blood destroyed by heat gives the spectrum of alkaline and acid hæmatoporphyrin. What the instrument does not tell is whether or not the blood is human or even mammalian; but, despite this drawback, the microspectroscopic test is much more delicate than the usual hæmin test or the microscopic examination for red corpuscles.

Lead Poisoning as a Danger to Health.—The great danger of using white lead for making paint is due to the 'dry rubbing' and the consequent lead dust caused thereby. It now appears that 'dry rubbing' is unnecessary. The paint containing the lead can be rubbed smooth by means of waterproof sandpapers, which cause no dust but a mere white mud, which may be washed off into a pail and disposed of. These waterproof sandpapers are reported by the trades using them to be durable and effective. Formerly, ordinary sandpapers were used, causing large quantities of lead dust to poison thousands and thousands of workers: so much so, that the total prohibition of white lead has been suggested and even demanded in the interest of life and health. By the introduction of waterproof sandpapers, white lead can still be used, with practically no danger to health to the workers in paint mixing. This represents a great industrial gain, having regard to the large numbers of workers employed in the production, preparation, and transport of the raw material, both at home and abroad, workers who would have been considerably reduced in numbers had the use of white lead been prohibited.

Duration of Pregnancy.—The Medico-Legal Society has recently reviewed the subject of the duration of pregnancy in its medico-legal aspect, and the president's conclusions are noteworthy. Sufficient medical data have been accumulated to show that human pregnancy may be prolonged to a period of 336 calculated days, and that there is nothing in the meanwhile to show that even this figure is the outside limit. At the same time, cases beyond 320 calculated days are so rare as to require, in all instances, the most careful scrutiny. The child would be much above the average weight and dimensions at the time of birth.

MENINGITIS COMPLICATING OTITIS MEDIA. (*See EAR.*)**MENINGITIS, MENINGOCOCCIC.** (*See also CEREBROSPINAL FEVER.*)

Sir James Purves-Stewart, K.C.M.G., C.B., F.R.C.P.

Intracisternal Treatment.—Although the employment of *Flexner's Anti-meningococcus Serum* has reduced the mortality and diminished the sequelæ in meningococcus meningitis, nevertheless the death-rate still remains high,

and residual disabilities persist in a certain proportion of cases. Amongst the latter may be mentioned hydrocephalus, optic atrophy, deafness, and even dementia. Any procedure, therefore, which offers a prospect of lessening these consequences of infection of the ventricles and subarachnoid space will be welcomed by all clinicians.

The ordinary serum treatment of meningococcus meningitis is sometimes disappointing in its results, for several reasons. Firstly, the particular serum employed may not be the one for the special strain of meningococcus which is present; this is often overcome by using a polyvalent serum corresponding to the four commonest types of meningococcus. Or the virulence of the organism may be so intense that the serum is of no avail. Or, again, the serum may be administered too late in the course of the disease, when the destructive processes already present are already sufficient to cause irreparable and often fatal damage to the brain structure. These various sources of failures have been emphasized by Ayer,¹ of Boston. It must also be remembered that antimeningococcus serum operates chiefly as a bacteriolytic agent, and must be brought into contact with the organisms it is intended to destroy. There would seem, therefore, to be three ways whereby the treatment of meningococcus meningitis might be improved: (1) By using a serum which shall be as polyvalent as possible; (2) By administering this serum early in the infection; and (3) By so introducing the serum as to bring it into better contact with the meningococci. Serum, of course, may be administered intravenously. Indeed, it has been claimed that almost 70 per cent of the cases of meningococcus meningitis show evidences of generalized blood-infection, and that the mortality can be considerably reduced by combining intravenous with intraspinal treatment.

Mitchell and Reilly,² of Philadelphia, have directed special attention to the mode of introducing serum into the subarachnoid space. Hitherto, there have been two chief points of entrance into the cerebrospinal subarachnoid space: through the lumbar region as by ordinary lumbar puncture, and into the lateral ventricles through the anterior fontanelle. Lumbar puncture is easy, and generally free from serious risk, and serum introduced by this route is curative in many cases. But if there is a subarachnoid block between the cerebral and spinal divisions of the space, so that free drainage from the lumbar region is impossible, this has usually been considered the indication for ventricular puncture. This latter procedure, with the introduction of serum, is efficacious in a number of cases, and has increased the proportion of recoveries; if properly performed it is also harmless. But after closure of the fontanelle, the ventricular point of attack is complicated by the fact that trephining becomes necessary. It is in these latter cases that **Cistern Puncture** has proved of special value. In fact, if cistern puncture can be shown to be at least as safe as lumbar or ventricular puncture, there are several reasons why cistern puncture would be preferable to the other two. The greatest amount of exudate in meningitis is often at the base of the brain in the cisternæ. It is from adhesions in this region that communicating hydrocephalus develops, as shown by Dandy³ and Blackfan.⁴ It is also probable that the internal type of hydrocephalus is caused by the spread of exudate and adhesions from the cisternæ into the foramina rather than from the ventricles into the foramina. By injecting the serum into the cisterna magna, it is brought, with very little dilution, directly into contact with the very part of the subarachnoid space which is most infected, without the necessity of traversing the spinal canal or passing from the ventricles through the foramina and thence into the cisternæ.

It is unnecessary to recapitulate the technique of cistern puncture through the atlanto-occipital ligament. Once the necessary dexterity has been acquired, it is as easy as lumbar puncture.

Mitchell and Reilly² record a successful case of meningococcus meningitis in an infant of four months treated by intracisternal injections of antimeningococcus serum. The child had all the signs of acute meningitis. Thick pus containing meningococci was obtained by lumbar puncture, and on two occasions from 1 to 1.5 c.c. of antimeningococcus serum were introduced with difficulty by the lumbar route. The cistern route was then adopted, and on three successive days 9, 5, and 8 c.c. respectively of serum were introduced, after removing a definitely larger quantity of cerebrospinal fluid on each occasion. The fluid rapidly became clear and meningococci disappeared. The patient made a recovery, with the residual phenomenon of atrophy of the left eye and optic nerve.

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MENINGITIS, TUBERCULOUS.

Sir James Purves-Stewart, K.C.M.G., C.B., F.R.C.P.

Until recently students have been taught that tuberculous meningitis is invariably fatal, and that, when the patient recovers, the diagnosis should be changed to one which is more plausible. Before the days of lumbar puncture and the identification of the tubercle bacillus there was some excuse for this doctrine. But now it is not only well established that the disease may clear up, but also that it does so in a considerable number of persons who have passed the age of childhood. Cramer and Bickel¹ have recorded a case in which recovery from tuberculous meningitis occurred in a patient of 19, whose cerebrospinal fluid contained tubercle bacilli, as shown both by direct microscopic examination and by guinea-pig inoculation. But the most interesting feature of their paper is the collection and analysis of other similar cases. Although about 250 have been published, the number becomes considerably reduced when only those are accepted in which the evidence is irrefutable. Such evidence is the post-mortem demonstration of old tuberculous lesions in patients who have died a considerable time after recovery from an attack of clinically typical tuberculous meningitis, or the finding of tubercle bacilli in the cerebrospinal fluid during the attack. The authors have collected 46 cases which pass the most stringent tests. In 23 the tubercle bacillus was demonstrated in the cerebrospinal fluid. In 14 others it was not found in the fluid, but its injection into guinea-pigs provoked tuberculosis. In 6 other cases the bacillus was demonstrated both by microscopic examination in the fluid and by guinea-pig inoculation.

Only one case of recovery has apparently been recorded in a patient under the age of 2 years, and the number of recoveries increases with age. Approximately 30 per cent of all the recoveries occurred in adults over the age of 20. Many of these recoveries are, unfortunately, ephemeral. The authors calculate that in at least 25 per cent death occurs, sooner or later, from tuberculosis. It is well, therefore, not to speak of complete recovery until several years have passed. In addition to the patient's age, a naturally acquired immunity seems to be the next most important factor in recovery. Neither of these factors is available for the infected infant.

Treatment by repeated withdrawals of Cerebrospinal Fluid is undoubtedly the most efficient means at our disposal. It possesses the double advantage of relieving mechanical distention within the cerebral ventricles, and of removing some of the toxic products of tuberculous inflammation.

The prevention of tuberculous meningitis depends upon arresting the primary focus of infection, to which the meningeal infection is always secondary. This

primary focus, according to Paterson's² recent statistics, in 61 cases out of 70 was in the mediastinal glands; in the remainder the primary lesion was in the mesenteric glands. From this it seems legitimate to conclude that the infection in most cases is by the inhalation of human bacilli, and that only in a small minority of cases is the milk-supply, with contamination by bovine tubercle, at fault. Tuberculous meningitis is uncommon in children during the first few months of life, when they are breast-fed. Children of the poorer classes, boxed up in the winter time with other people from whom they may inhale the tuberculous infection, are specially frequently affected. The outbreak of tuberculous meningitis commonly follows some acute pulmonary trouble, and one-third of Paterson's cases occurred shortly after measles or whooping-cough. He points out that the maximum age-incidence of these diseases is about the same age, and also about the same season, viz., the spring-time, as in tuberculous meningitis. Bearing in mind, therefore, the frequency of mediastinal glandular lesions as the primary focus of infection, he suggests that this focus might be recognized by the more regular use of X rays. If a primary lesion is demonstrated or suspected, the child's general health may be raised by abundance of fresh air and good food, so as to prevent the primary lesion from becoming miliary. After the age of 3 years, the incidence of tuberculous meningitis rapidly falls, and after 10 it is comparatively rare. It is up to this age, therefore, that special and concentrated precautionary measures should be taken.

REFERENCES.—¹*Ann. de Méd.* 1922, Sept.; ²*Practitioner*, 1923, June, 431.

MENTAL DISEASES. (*See also* DEMENTIA PRÆCOX; DRUG ADDICTION; FOLIE À DEUX; GENERAL PARESIS; MANIC-DEPRESSIVE INSANITY; PARANOIA.)
C. Stanford Read, M.D.

Though any definite psychiatric advance seems hardly to merit it, a more optimistic attitude is being adopted with regard to the general outlook upon mental disease. At any rate, the increased interest which is being manifested, both by society and psychiatrists, can only be productive of good. We have had evidence of this interest, not only in mental disease itself, but also in the various relationships which may exist between mental states and those maladaptations to the social environment as displayed in industrial unrest, delinquency, and crime. As will be seen later, there is a growing tendency to develop the power of the Mental Deficiency Act, though undoubtedly its practical applications are much hampered by economical factors and a dearth of medical officers who are competent to deal with its intricacies. The new Mental Treatment Bill now being dealt with by the Legislature will be a distinct progressive step, by means of which it will be so often possible to abort a fully developed psychosis. In the opening of the Maudsley Hospital we have the beginning of a new era, and elsewhere there is a linking up of the general and mental hospital. It is, however, not likely that this will, to any material degree, remove or modify the stigma which is attached to mental disorder. The roots of this lie deep in the human mind, and we must mainly look to the influences of education for its removal. It is therefore all the more disappointing that, in a small volume¹ lately published with a view to instructing 'the people' on mental functioning, not only was a great opportunity lost of combating this idea, but that the euphemistic term 'nervous-break-down' is reiterated. The term 'mental' must be insisted on, with a view to that familiarity which will go hand in hand with a more rational emotional reaction. Porter Phillips² has demonstrated both theoretically and practically, from his out-patient department at Bethlem Hospital, the good that has resulted and can still more accrue from such clinics. At the annual meeting of the

Medico-Psychological Association (1923) English psychiatrists had the privilege of listening to Clifford W. Beers, the founder and secretary of the American National Committee of Mental Hygiene, and those who know his work and his classic volume, *A Mind that Found Itself*, can only be stimulated by his visit. The British National Council for Mental Hygiene is moulding its forces, and its activities should be encouraged by the statement made by Dr. Clarke,³ the Maudsley Lecturer, that "in Canada more good has been done by the mental hygiene movement in five years in improving the care of the insane, the study of defectives, and educating the public to the importance of these problems, than in the preceding six decades".

GENERAL PATHOLOGY.—From the opposing views of those who take up a purely physiogenic or psychogenic aspect of mental disease, we shall eventually have a compromise school in formation who will look upon the organism as a whole without laying undue stress on either conception. In this respect Strecker⁴ appeals for a non-specific etiology of mental disease. He points out that in each human being there is a utilizable amount of resistance, no more and no less, and if detrimental influences, whatever be their nature—hereditary, physical, or psychic—overbalance this defence, the connection with reality ceases. This non-specific conception demands a painstaking 'long-section' rather than a 'cross-section' survey. The removal of infected teeth, tonsils, etc., need not, and should not, exclude legitimate psychotherapeutic procedures in the same or in another case, or vice versa. Beaton,⁵ though taking the somewhat narrow view that there is an essential unity of the processes of the mind and brain, rightly insists that in studying the mind one is studying the life of a living unity, and that though data as revealed by analytic methods are very valuable, it is irrational to endeavour to solve the problems of life by purely psychological means. It is true, however, that in the past the psychological factor has been sadly neglected. Amsden⁶ lays stress on the phylogenetic and ontogenetic study of the personality, since it is in the emotional components that the life-history rises to its maximum. Long before the psychosis we are able to see in the personality premonitions of neuro-psychiatric trouble, and the type of psychotic behaviour may often be predicted from an understanding of the personality. He thinks, too, that from a personality analysis we can estimate the degree to which psychotic reactions may remain fixed, and the physician is thus enabled to map-out a treatment or restraining programme with precision.

Much literature is devoted to the material aspects of mental disease. Keiltz⁷ regards mental diseases as primarily or secondarily dependent upon general bodily diseases, unless they are the result purely of a specific stimulus or hereditary deficiency. He thinks that heredity plays a prominent rôle and lowers the mental threshold so that somatic influences, which would otherwise pass unnoticed, become prominent. These somatic influences start in early life and are toxic in nature, either bacterial, chemical, or both, and may be especially operative in præcox cases.

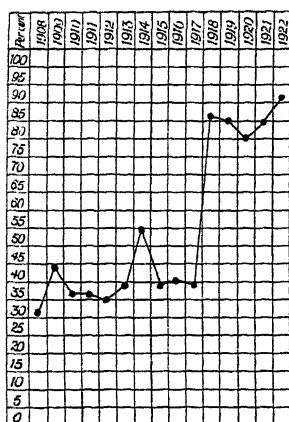
The various *hæmatological, toxicological, and bacteriological considerations relating to the psychoses* are dealt with by Goodall⁸ in his Presidential address to the Medico-Psychological Association. He pointed out that many disorders of mind occurring in febrile processes cannot be due solely to febrile disturbances, and that the toxic factor must be taken into account. Hence in certain of the everyday insanities of unknown origin we should look for endogenous or exogenous toxins. Morbid histology of the brain in the acute and recent psychoses shows no evidence of a virulent toxæmia, with the possible exception of acute delirious mania. Intestinal toxæmia can hardly be in relation to these, and disinfectants given by the mouth have no favour-

able influence. Examination of the blood for organisms gave negative results, and there is no justification for the view that any micro-organisms found in the blood-stream have any relationship to the phenomena of mental disorder. In 100 newly admitted cases, examination of the urine gave positive results in 32. Among the 23 paralytics there were positive results in all, and in the other 77 there were positive results in 21. The organisms found were *B. coli* (twice), staphylococci (29 times), streptococci (11 times), Gram-negative bacilli (10 times), Gram-positive bacilli (7 times), streptothrix (twice). Nearly all the paralytics manifested an infection of the urethra with Gram-fast diplococci and the presence of diphtheroids. Both Scholberg and Goodall have found that in the wash-out (with normal saline) of the fasting stomach in cases of adolescent insanity there were pus-cells in 60 out of 68 cases. Experimental work on the toxicity of the blood showed that when a number of rabbits were infected with the blood serum or corpuscles of patients with various forms of insanity, 25 per cent of these died from an unknown cause, great wasting preceding their death.

Since the existence of *leucocytosis* in toxic states has led various workers to seek evidence of toxicity in the psychoses as shown by qualitative and quantitative changes in the leucocytal count, Goodall summarizes our present knowledge with regard to this. In earlier phases of dementia præcox there is moderate increase in the total white-cell count, with relative increase of the neutrophils. In marked exacerbations of the morbid processes these increases are more pronounced, and progress towards dementia is characterized by a relative lymphocytosis with a low total count. There is not sufficient evidence of differences in the various forms of dementia præcox. In insanity with epilepsy the results show leucocytosis and polynucleosis with hypo-eosinophilia in connection with seizures, uncharacteristic conditions obtaining in the intervals. In manic-depressive insanity there is a high total count with relative neutrophil increase at the onset; these subside as the disease progresses; perhaps a second minor increase accompanies symptoms of recovery. The persistence of this with a normal percentage of neutrophils after recovery is a favourable sign. A fall in the neutrophil percentage without mental improvement is an unfavourable sign. In puerperal insanity the leucocyte count resembles that of acute mania. In states of acute confusion, leucocytosis, polynuclear increase, and hypo-eosinophilia pass away with decline of the illness and recovery. In general paresis there is moderate leucocytosis and relative neutrophil increase in the first stage. Later, towards and during the third stage, the lymphocytes are relatively increased at the expense of the neutrophils. It is thought that the evidence furnished by these observations in the psychoses is in favour of toxæmia but not a grave form of it. Goodall also refers to the beneficial effects on mental states of such intercurrent maladies as typhoid, erysipelas, and malaria, and the fact that a febrile reaction was not a necessary concomitant. The chief mental states so benefited were mania, melancholia, confusional and stuporose states. Remarkable remissions may also be brought about in general paresis. We are far from understanding the rationale of imitating the effect of intercurrent disorders, but it may be an example of non-protein therapy. Hopeful results were derived from the injection of sodium nucleinate.

The relation of chronic sepsis to the functional psychoses has been dealt with fully by Cotton.⁹ He belittles the factors of heredity and psychogenesis, and his thesis is that these psychoses are due to "a combination of many factors, but the most constant one is the intracerebral, biochemical cellular disturbance arising from circulating toxins originating in chronic foci of infection, situated anywhere throughout the body, associated probably with secondary disturbance

of the endocrine system". Infection of the teeth is regarded as the most constant focus, and the mouth cannot be considered free from infection unless



Average 1908 to 1917, 38 per cent (exclusive of 1914).

Average 1918 to 1922, 87 per cent (increase of 49 per cent).

Fig. 72.—Results of Cotton's 'focal infection' treatment in mental disease. The chart shows the percentage of discharges to admissions in the functional group.

infected tonsils are removed. The various types of streptococci and colon bacilli are found to be chiefly responsible. Infection, however, may spread to other parts of the body, which would account for the fact that no good results sometimes occurred from the elimination of infected teeth and tonsils. Secondary foci of infection of the stomach, duodenum, small intestine, gall-bladder, appendix, colon, and genito-urinary tract can also arise. Cotton goes further still and regards as important the possible involvement of mesenteric lymph nodes, the female cervix, the seminal vesicles, and the antrum. Thus treatment by detoxication becomes the only course. All the infection from the above-named sources must be eliminated and, if necessary, autogenous vaccines made from the bacteria isolated in the stomach contents are administered. Even colectomy in certain cases is thought justifiable. As regards results, the claim is made that the recovery-rate at the State Hospital, Trenton, America, during the past four years has been over 80 per cent (see Fig. 72 and table below), and the proportion of re-admissions is said not to have increased. The failures are

explained upon the ground that the brain had become permanently damaged

TWO HUNDRED CASES IN FUNCTIONAL GROUP. ON VISIT RECOVERED. 1919-20.

	Total	Teeth	Tonsils	Gastric	Vaccine	Vesicu- lectomy	Colon
Males:—							
Manic-depressive	49	49	39	41	41	1	—
Dementia præcox	18	18	13	13	13	—	—
Paranoid state	15	15	11	14	14	—	1
Psychoneurosis	7	7	7	6	6	1	—
Toxic psychosis..	11	11	6	9	10	—	—
	100	100	76	83	84	2	1
Females:—							
Manic-depressive	66	66	47	50	46	8	9
Dementia præcox	8	8	7	7	7	5	2
Paranoid state	9	9	6	5	5	1	1
Psychoneurosis	10	10	6	7	6	2	—
Toxic psychosis..	7	7	7	7	7	4	1
	100	100	73	76	71	20	13

and no amount of detoxication could have any effect in restoring the mental condition. Such observations seem to be extremely startling, sufficiently so for the public press to refer to these findings under the headlines—"Curing the Insane—Malady traced to poisonous substances—Wonderful cures effected by new treatment". It is a pity that the press should so disseminate ideas which there is good reason for believing can only arouse false hopes in the minds of the laity. There is no adequate space here for any detailed criticism, but it must be more and more insisted upon that only by studying the human organism as a whole and in longitudinal section will the various factors inductive of mental disorders be scientifically evaluated. It is known that other psychiatric investigators have worked on the same lines with very different results. Kopeloff and Cheney¹⁰ studied 38 women and 28 men, of whom was made a very thorough physical and psychological examination. All the patients were divided into two groups as nearly identical as possible. All members of one group received operative treatment for foci of infection in teeth and tonsils, while others did not, and could be regarded as controls. The authors found that the removal of infected teeth and tonsils from 27 cases showing manic-depressive, dementia præcox, and psychoneurotic reactions were followed by no more mental benefit than was shown by a comparable group of 33 patients from whom such supposed foci of infection were not removed. There were no recoveries or distinct improvements other than those prognosticated irrespective of focal infection. It certainly must be noted that grave dangers may attend the wholesale surgery thus undertaken, and far more evidence will have to be forthcoming before we have adequate reason for believing that a flourishing paranoiac or a præcox patient can be cured by such means.

On the theory that *auto-intoxication from disturbance of the protein metabolism arising through lesions of the liver or kidney* might be the cause of mental symptoms, Frigerio¹¹ examined many cases of the common forms of mental disorder. The nitrogen value was smallest in mania, dementia præcox, and post-influenzal confusion. A medium figure was found in melancholia, while in confusional insanity the figure was medium and high. Frigerio maintains that a nitrogen value of 0.5 to 1 grm. per mille indicates a cautious prognosis *quo ad vitam*. He confirms the results of Weston, who found a low figure in manic-depressive insanity, dementia præcox, and epilepsy. Altogether he finds the estimation of the non-coagulable nitrogen of the blood of the greatest use in psychiatry, and regards the symptom of confusion as attributable to nitrogen retention.

The determination of the basal metabolic rate (i.e., the energy output to keep the body alive), Walker¹² states, assists in a better understanding of cases of mental disorder in which disturbance of the thyroid function may be an important factor, and abnormal metabolic rates should be correlated with the clinical findings. In the dementia præcox cases he examined, 50 per cent showed a subnormal basal metabolism, the average rate being 20 per cent less than the normal. No material change followed the administration of thyroid extracts. It is suggested that the diminution of the oxidation processes in the body tissues is due to a hypofunction of the nervous system, particularly the autonomic, and not to thyroid disorder primarily. During remission in the course of dementia præcox the basal metabolic rate approaches that of the normal. In other types of mental disorder the rate was normal, except in one with clinical evidence of hyperthyroidism. Walker found that the high-frequency current increased the basal metabolism on an average of 10 to 15 per cent in all cases, and that in conjunction with other measures this is a useful mode of treatment in cases of mental disorder where there is subnormal basal

metabolism. Most of these findings are confirmed by the studies of Gibbs and Lemecke.¹³ Santenoié,¹⁴ in his experimental work, also sees an intimate connection between a disequilibrium of the vago-sympathetic system and periodic psychoses.

Mott and Robertson¹⁵ report on their *histological examination of the pituitary gland* in 110 asylum and hospital cases. The cases of general paresis showed an increased activity, eosinophilia being marked. Fibrosis and vascularity were present, while the lipid content in both cells and interstitial tissue was increased. The cases of dementia præcox showed a marked degree of exhaustion, and there was an almost complete atrophy of the cellular elements of the gland. With regard to the other psychoses, there was normally a considerable similarity in structure and staining reactions of the eosinophils of the pituitary gland and the interstitial cells of the testes.

Mental Disorders following Traumatism.—These are of special interest because of their doubtful pathology. Gordon¹⁶ collected 126 cases which presented the following groups: 20 cases of a confusional state, 25 of amnesic phenomena of varying degree, 25 of depression, 7 of epilepsy, 9 of paresis, 30 of neurosis, and 7 of progressive mental enfeeblement. He describes the important features of each group, and discusses the points presented in their several clinical features with their possible pathogenesis. In paresis this writer regards trauma as frequently playing no small factor in its production. Very little literature exists on this important relation of trauma to the wide range of mental disorders which may follow.

Alcohol and Mental Disease.—Investigation in America into alcoholic psychoses before and after prohibition, made by Pollock,¹⁷ gives the following results. A marked reduction in the prevalence of these psychoses throughout the States has taken place since 1910. The lowest rate of first admissions occurred in 1920; a reaction occurred in 1921. The rate of alcoholic first admissions is closely connected with the *per capita* consumption of liquors. The reduction in the rate of alcoholic psychoses has been relatively greater among women than among men. One must, however, be chary of drawing definite deductions from these statistics, and more especially so since Pollock does not tell us what psychoses he embraces under the term 'alcoholic'. In the last number of the MEDICAL ANNUAL it was pointed out that these should be much more restricted than they are.

The racial aspects of alcoholism are dealt with by Feldman,¹⁸ who regards the condition as having a recessive Mendelian character. Riggall¹⁹ deals with alcoholism from a psycho-analytic point of view.

Psychic Symptoms in Epidemic Encephalitis.—Insabato²⁰ speaks of a state of acute hallucinatory delirium resembling that found in alcoholic psychoses as sometimes occurring. This may appear at any stage of the illness, but in some cases is seen at the very onset. He lays stress on the importance of looking for early neurological signs in all cases with delirium and hallucinations, in order to make a diagnosis from hysteria, epilepsy, and other confusional states. As in other forms of central nervous lesion, the form of the symptoms is influenced by the personality of the patient. Naville²¹ regards as even possibly a pathognomonic disturbance of the mentality in this disease, a lethargic or psychomotor torpor, often accompanied by impairment of psychomotor automatisms analogous to that of motor automatisms. He thinks there is something specific in the extreme fatigability of initiative, interest, and psychomotor activity, for which he proposes the name 'bradyphrenia'. Truelle and Petit²² believe that the psychical symptomatology of this encephalitis is very variable, and enumerate among the syndromes the

lethargic, the confusional, the depressive, the agitated or manic, and the catatonic varieties. The confusional form is that common to any kind of toxi-infective invasion of the cerebrum; psychopathic manifestations otherwise are a function of individual predisposition revealed, but not originated, by the disease. They think that perhaps the most specific mental sequel is a pseudo-dementia taking an inhibitory form, a sort of psychical torpor. A peculiar transformation of the personality due to encephalitis lethargica is reported by McNeil.²³

Racial Psychiatry.—Gans,²⁴ of Holland, makes an interesting contribution on this subject from observations among the Javanese. Notwithstanding the immense difference between the psychology of the Javanese and that of the European, so great indeed that any real understanding of the personality of the Javanese is almost impossible for us, the psychotic phenomena are nevertheless identical in the two races. He concludes from these observations that in spite of the greatest individual differences between members of widely distinct races, the essence of their human nature is the same. That is to say, heterogeneity and differentiation are found in the conscious psyche, whereas the collective unconscious is uniform.

Suicide.—An interesting study of the unconscious motivation of suicide is given us by Pierce Clark.²⁵ After an historical introduction, he quotes at some length the views of Sadger, Stearns, Heller, Stekel, Adler, and Freud. Illustrative case-histories follow, and he then sums up the determining factors in the suicidal act: There must be a great disturbance of the normal balance of desire to live. This may or may not formulate itself as a distinct psychosis. There is in this withdrawal from a normal adaptation to reality an increase of intrapsychic tension formed from the conscious and unconscious conflicts, and this usually resolves itself into what is properly called a sin either of commission or omission. If the infantile unconscious demand is sufficiently strong and the mental regression goes deep enough, we obtain the fundamental solution in self-destruction, not because in the last analysis the person really chooses this end consciously, but because the dynamic fixation of infantile attachment decides it. This is usually formulated directly as the call of the parent or loved one, or by the still more insistent demand of the Supreme Being. Psychologically one easily discerns in the beckoning or call of the latter that of the all-compelling parent. Sane suicides, Clark thinks, have the same psychology as the psychotics. May we not, however, take on new zeal in simple talk to many suicidal patients and help to lessen the intrapsychic tension by such manner of approach as shall be acceptable to the individual and his special type of conflict. Thus transference or intensive personal influence may succeed in resynthesizing the soul unity of the desperate and despairing patient. Marcuse²⁶ shows that there is an intimate connection between suicide and erotic factors, both conscious and unconscious, and gives interesting data to support this.

Mental Deficiency.—The biological factors in mental defect are discussed by Auden,²⁷ who thinks that confusion has arisen from failure to discriminate between pathological and biological factors. The social organism and mental deficiency are probably controlled by biological factors, the causative factors in the latter being probably phylogenetic. He quotes Rivers' and Head's researches, and regards the lowest grade of idiot as not having advanced beyond the protopathic stage of evolution. The lighter degrees of idiocy and imbecility can be interpreted in degrees of epicritic control. The wide variations in intelligence and educational capacity can be explained on a biological basis. In summarizing, the author divides mental deficiency into phylogenetic and ontogenetic groups, which may be termed the evolutive and devolutive types.

In the evolutive type the child has not evolved to the average mental level demanded by the community, and in the devolutive type accident or disease has produced degenerative changes in the brain. If the existence of biological factors in the production of mental defect is established, then, to be effective, eugenic measures must be founded on biological principles.

It hardly seems necessary to say that the endocrine glands are brought in as intimate factors in relation to mental defect by some writers. Goldstein²⁸ finds many defective children with pluriglandular defects. The predominating factor he sees in hypothyroidism. Glandular therapy, of course, is to be used persistently. Berkeley²⁹ also finds gratifying results from pluriglandular mixtures in Mongolism.

At the Annual Meeting of the British Medical Association, in the Section of Medical Sociology, a discussion was held on *mental deficiency in relation to its social aspects*.³⁰ Mrs. Pinsent, a Board of Control Commissioner, attempted to show how far the Mental Deficiency Act had met the difficulties experienced by the community in adequately protecting the mentally defective. Twenty-five thousand cases have been ascertained; 9854 of these have been placed under supervision. Compared with the numbers needing protection, these figures can only be said to constitute a beginning.

Potts points out that the estimate of the investigators for the Royal Commission on the Feeble-minded in 1906, of 1 in every 200 of the population, probably does not err on the side of excess, and doubts that proper use of the Mental Deficiency Act is being made. He lays special stress on the need for a study of the relationship of mental defect to such social problems as venereal disease, chronic drunkenness, illegitimacy, criminality, delinquency, and the unemployed. Though the principal cause of mental defect is heredity, it is not the only cause; and though segregation, even if only partial, will reduce the number, all unfavourable factors must be eliminated: the racial poisons, syphilis and alcohol; infectious disease of the mother during pregnancy; toxins; and bad environment. Great opportunities lie in the antenatal and school clinics. Sterilization appears to Potts as an irrational procedure, and he says that if defectives have a right to live, they have a right to live as un mutilated individuals.

Devine limits his discussion mainly to the high-grade cases which more especially give rise to a social problem. Segregation as a form of treatment prevents delinquency, vagrancy, and prostitution, and also prevents propagation by persons who will probably produce inferior children. Such individuals will not only cease to be destructive social units, but may become self-supporting and useful members of the community in which they are placed. It is not likely that any abuse of segregation would occur in this country; but what is its value from the eugenic standpoint, how far is complete segregation of large numbers practicable, and how far would it cut off the supply? It is the moron plus bad behaviour that we feel justified in placing under control, but the anti-social behaviour may be a product of faulty environment. It is an interesting eugenic question whether the good and harmless moron, whom we should not dream of segregating, is likely to produce children biologically superior to those of the vicious moron whom we do segregate. If all mental defectives were prevented from propagating, a large number of degenerate individuals would still be produced as a result of mental weakness in the parents, and if the present social trend against the segregation of psychotics is carried to an extreme, it may act unfavourably on the mentality of the coming generation. Others who may produce degenerate offspring are the imperfectly delimited group of psychopathic personalities and a large number of biologically inferior persons in whom the hereditary taint was indirect. By no system of segregation could

the birth of such individuals be avoided. In many cases we simply cannot account for the deficiency. Just as we certify the insane because they behave abnormally, so we should content ourselves with segregating those defectives who are unable to care for themselves or who exhibit antisocial propensities. We cannot control the birth of human beings as we can that of animals.

Gibbons, dealing with the subject of *Sterilization*, regards it as remarkable that, notwithstanding the large increase in the number of mental defects, so much hesitation concerning the adoption of drastic measures for their reduction exists. Heredity, he thinks, being the main factor, if there be no indication that the child can ever be looked upon as normal or approaching to normal, then, in his opinion, steps ought to be taken to prevent that child ever becoming a parent; especially so since mental defectives reproduce their kind two to six times more rapidly than those who are normal. When the child reaches the age of sixteen, when every possible means of treatment has been tried, and after the subject has been passed by one or more alienists, sterilization, a perfectly humane method, should be carried out. In the case of sterilization of adults, a State certificate of marriage must be the first step, though it is not always easy to say at once that a man or woman desiring marriage is defective. Though there would be difficulties to be overcome, Gibbons regards sterilization as the safest and most effective course, and he is highly optimistic as regards the eventual results.

Norwood East, of Brixton Prison, quotes the American figures relative to the large percentage of *mental defects in the prison population*, and says that in our own country the Mental Deficiency Act has shown such statements to be erroneous if we accept the statutory definitions of defect as embracing the various forms of amentia. In dealing with crime one should discriminate between mental deficiency and inefficiency. A large group of subnormals remain outside the scope of the Mental Deficiency and Lunacy Acts, and an attempt should not be made to stretch the definitions of mental deficiency to include any of them. As further progress in the treatment of the mentally inefficient criminal lies in the direction of this borderline and psychopathic group, its existence should be insisted upon and distinguished from the defective and insane. The number of criminal defectives (amentia) is considerably less than is often supposed, but with increased individual psychology it is reasonable to suppose that some slight increase in the number may be found in future. A gratifying feature in the general prison figures is that the proportion of defectives certified after conviction is steadily falling, whereas the number certified before conviction is steadily increasing. Certification in criminal cases ultimately depends upon a capacity to earn a living and abstain from crime. No criminal offence is pathognomonic of defect, but the largest numbers are crimes of acquisition, sex, and vagrancy. By early diagnosis and certification the criminal ament is prevented from becoming a recidivist.

Mental Disease and Crime.—Potts³¹ considers the psychological treatment of criminals, the demand for which he says has come partly through consideration of the mentally defective. He draws a distinction between the latter and a psychopathological group which are no more responsible than the insane for the defect, but are amenable to treatment. Comparisons are given of the régimes adopted in different countries, and he outlines the examination of delinquents carried out at Birmingham Prison. Hamblin Smith and Pailthorpe,³² working in the same centre, contribute a paper dealing with the results obtained with the Hamblin Smith scheme of tests on prisoners. Of completely examined cases there were 217 men and 108 women. The authors venture to think that their findings indicate at least one thing—that is, the enormous importance of mental conflict as a cause of delinquency.

In a discussion at the Hunterian Society on *insanity in relation to criminal law*, Porter Phillips³³ stressed the relationship of the power of volition to impulse, and said it was impulsive action associated with crime that gave rise to serious controversy when the question of responsibility was under consideration. He thought that the plea of insane impulse might be reasonably accepted when there was other evidence of mental impairment, and that in every case of murder the Crown should appoint an impartial tribunal composed of at least four medical experts, including the prison medical officer under whose immediate care the accused had been placed. William White,³⁴ of Washington, embodies the conclusions he has come to on mental disease and the criminal law from his many years' experience as a psychiatrist who has administered a criminal department of a hospital where the prisoners suffered from mental disorder. He treats of the various factors in crime and the criminal from the psychological point of view, and points out what changes must take place before there can be any adequate progress in criminological problems. Though largely destructive in his criticisms of the present relations between the law and medicine, he makes many interesting constructive suggestions. Stanford Read³⁵ deals briefly with similar topics. Concerning the deeply-seated unconscious conflicts of the individual criminal, Karpman³⁶ speaks at some length of the sexual offender, and from illustrative histories endeavours to show that "individuals arrested on the charge of writing and sending obscene letters through mail, can often be shown to be homosexuals, whose antisocial activities are psychogenetically motivated by unconscious conflicts, and they should therefore be treated as mentally ill and not as criminals".

TREATMENT.—Graves³⁷ discusses the clinical use of collosol preparations, and speaks of a case of mental derangement with tuberculous history where cod-liver oil and calcium lactate produced no improvement either in the mental or physical condition. Following injections of Colloidal Calcium Oleate (cod-liver oil continued) she began to put on weight, became less restless and excitable, ceased to be wet and dirty, wrote a sensible letter, and within two months was helping in the ward. Believing as Graves does, with Cotton, that chronic sepsis has an intimate relationship to mental disorders, he states that it would appear that calcium plays a part in the re-activation of the mobile defences of the body in conditions of chronic sepsis, and, after the removal of the cause of the sepsis, calcium dries up the exudates by the induced reaction. Many observers have noted the effect of calcium in reducing or inhibiting exudate formation, probably by increasing the consistency of the colloidal systems of the cell membranes which foreign protein reduces. The production of phagocytic reactions as a mode of treatment in disturbed mental states has been noted as a sequence of injections of colloidal calcium, the results being comparable to the nucleinic reactions. From the cases he quotes he regards such treatment as having improved the hedonic tone and diminished the activity of the destructive emotional processes.

From a psychological standpoint O'Malley³⁸ believes that a **Positive Transfer** may be used in institutions for the treatment of the neuroses and psychoses to prevent deterioration, aid adaptation, and help towards recovery.

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July; ¹⁵*Arch. of Internal Med.* 1923, Jan.; ¹⁴*Presse méd.* 1923, April 25; ¹⁶*Jour. of Ment. Sci.* 1923, July; ¹⁶*N. Y. Med. Jour.* 1922, Sept. 20; ¹⁷*Mental Hygiene*, 1922, vi, 815; ¹⁸*Brit. Jour. Inebriety*, 1923, xxi, 1; ¹⁹*Psycho-analytic Rev.* 1923, x, 157; ²⁰*Riv. di Patol. Nerv. e Ment.* 1922, Oct.; ²¹*L'Encéphale*, 1923, xvii, 423; ²²*Ibid.* 1922, xvii, 582; ²³*Amer. Jour. of Psychol.* 1923, xxxiv, 13; ²⁴*Munch. med. Woch.* 1923, Oct. 27; ²⁵*N. Y. Med. Jour.* 1922, Sept. 6; ²⁶*Zeits. f. Sexualwissenschaft*, 1922, Oct.; ²⁷*Psyche*, 1923, iii, 240; ²⁸*N. Y. Med. Jour.* 1922, Sept. 20; ²⁹*Ibid.* Sept. 6; ³⁰*Brit. Med. Jour.* 1923, Aug. 11; ³¹*Lancet*, 1922, Dec. 23; ³²*Ibid.* 1923, July 21; ³³*Ibid.* 1922, Dec. 22; ³⁴*Insanity and the Criminal Law*, 1923 (The Macmillan Co.); ³⁵*Jour. of Neurol. and Psychopathol.* 1923, iv, 35; ³⁶*Psycho-analytic Rev.* 1923, x, 270; ³⁷*Lancet*, 1922, ii, 958; ³⁸*Psycho-analytic Rev.* 1923, x, 1.

MIGRAINE. (See also EYE AFFECTIONS, GENERAL.)

Sir James Purves-Stewart, K.C.M.G., C.B., F.R.C.P.

Treatment by Peptone Injections.—Since 1919, when Pagniez, Vallery-Radot, and Nast¹ published reports on the treatment of migraine by intravenous injections of horse serum, later substituting peptone for the serum, their suggestion that the attack of migraine is an anaphylactic phenomenon has been supported by a considerable amount of clinical evidence. Abel² in the same year reported his results of treatment in 100 cases of migraine by intramuscular injections of placental extract. He was led to select the placenta on account of the fact that migraine frequently disappears spontaneously during pregnancy. His theory, however, was not one of desensitization, but rather of some obscure endocrine effect.

Miller and Raulston³ have recently published a series of 25 cases of migraine treated by intravenous injections of Peptone, with suggestive comments thereon. They employ a 5 per cent solution of Armour's 'peptonum siccum'. Their solution is prepared by dissolving the peptone in 0.9 per cent sodium chloride solution, so as to make a solution of about 6 or 7 per cent. This is then neutralized by adding a half-normal caustic soda solution, using litmus paper as an indicator. The solution is now made up to the volume required to make a 5 per cent solution, filtered until clear, and placed in 5-c.c. ampoules and autoclaved in the usual manner. In order to determine whether the preparation is sterile, the ampoules are incubated: if they remain clear, they are ready for use. The first intravenous injection is 0.5 c.c., the dose being rapidly increased up to 2 c.c. Two injections are given weekly until the headache disappears, then one weekly, and, if the improvement continues, once in two weeks, and finally once a month. In several hundred injections they themselves have never observed any symptoms of anaphylactic shock, nor in fact any reaction, provided the preparation is sterile. When a chill follows the injection, it is due to an infected solution. Recently, however, another physician observed marked urticaria in two patients following a single injection.

The results in their 25 cases are clearly tabulated. All were relatively severe types of migraine, with three or four attacks per month, rarely as few as one or two, or as many as eight per month. The total number of injections in any individual case varied from 6 to 42.

Three groups of results emerge from the above series: The first group, 9 out of 25, were much improved, and remained free from headaches for a period of two months or more after the treatment was discontinued (four cases were free for 2 months, two for 3 months, one for 4 months, one for 6 months, and one for 9 months). At the end of this period the headaches returned, but were again controlled by the peptone. The second group, 12 out of 25, were moderately improved, in that the attacks were definitely less frequent and less severe. Ten cases in this group had nausea or vomiting, and in all but two it disappeared. The third group, 4 out of 25, were not benefited, at least not appreciably.

Our knowledge of clinical anaphylaxis is progressively increasing. The list of diseases within this category includes hay fever, asthma, urticaria, some

forms of eczema, and possibly also angioneurotic oedema, intermittent hydrarthrosis, some varieties of epilepsy, and migraine. All these maladies have certain points in common. Probably the most striking is their periodicity. It is well recognized that asthmatic attacks develop suddenly and are usually self-limited in duration, being followed by a longer or shorter period of freedom. In this respect they resemble the attacks of migraine, which are often followed by a period of relative immunity during which nerve strains which would ordinarily precipitate an attack are without effect. This might reasonably be interpreted as a refractory period corresponding to the anti-anaphylactic state observed in animals following anaphylactic shock—a period during which they are relatively desensitized.

Migraine, like asthma and hay fever, is often hereditary. Gowers and others called attention to the frequent association of asthma and migraine in certain families, whilst Living and Moebius referred to the not infrequent development of asthma in migrainous patients.

Migrainous attacks frequently disappear temporarily after severe prolonged infections, especially after enteric fever. This also might reasonably be explained by desensitization acquired through the infection. In this respect migraine resembles asthma, for sometimes an asthmatic patient enjoys a prolonged period of immunity following a severe infection.

Migraine and asthma are frequently favourably influenced by **Pregnancy**. Migraine, in the majority of cases, subsides during the latter half of pregnancy. In asthma this is much less constant, and, in fact, asthmatic attacks may first appear during pregnancy. Many instances, however, are on record in which asthmatic attacks have disappeared during this period. Coke⁴ recently described the case of a chronic asthmatic patient who during six pregnancies was entirely free from attacks. In such cases a possible explanation is that the placenta behaves as a foreign protein and desensitizes the individual.

Mention is frequently made of the rôle played by **Foods** in precipitating an attack of migraine, but little information is yet available as to the responsibility of a specific article of food in an individual case. Pagniez, however, refers to a patient who had migraine regularly after eating chocolate, Brown⁵ records a case precipitated by eggs, and Moebius refers to attacks being sometimes precipitated by odours and by certain drugs, referring also to a series of 90 cases studied by Symond, in 19 of which the attacks were considered due to dietetic errors.

The presence of eosinophilia during the migrainous attack is perhaps one of the strongest evidences of its anaphylactic nature. Neusser⁶ as long ago as 1892 reported definite eosinophilia during severe attacks of migraine, and Gänsslen⁷ in 1921, in a series of 42 patients examined during the attack, found in 31 cases an eosinophilia of 5 to 16 per cent or more. If further observations confirm these findings, they will furnish highly suggestive evidence.

The relief obtained by peptone injections, according to Miller and Raulston, is temporary, inasmuch as the headaches return within a few weeks or months after the treatment has been discontinued. In this respect migraine behaves like hay fever and asthma, in which desensitization is rarely permanent. The reported alleviation of migraine by the use of horse serum, typhoid vaccine, placental extract, and peptone, indicates that a variety of proteins are capable of producing changes responsible for this improvement. But the desensitization is not a specific one, for it is less complete and apparently of shorter duration than that produced by specific proteins in the case of asthma.

REFERENCES.—¹*Presse méd.* 1919, April 3, *Ibid.* 1920, April 28, *Ibid.* 1921, Jan. 15; ²*Deut. med. Woch.* 1921, Oct. 13; ³*Jour. Amer. Med. Assoc.* 1923, June 30, 1894; ⁴*Brit. Med. Jour.* 1922, i, 455; ⁵*Jour. Amer. Med. Assoc.* 1921, Oct. 29, 1396; ⁶*Wien. klin. Woch.* 1892, No. 6, 41; ⁷*Med. Klin.* 1921, Oct. 2, 1202.

MILK, PURITY OF.*Joseph Priestley, B.A., M.D., D.P.H.*

Pasteurization.—The Ministry of Health has issued a report recently on the important subject of the pasteurization of milk, and points out officially that pasteurization (if properly done) will render milk safe, improve its keeping qualities, and not appreciably affect its nutritive properties. How is pasteurization to be 'properly' done? First of all, the applied heat must not be less than 145° and not more than 150°, and its application must be for a period of thirty minutes. There are other details to be considered. The milk must be thoroughly cooled immediately after pasteurization, and kept under good conditions until consumed. "Repasteurization is undesirable", says the report. A pasteurizer must be moderate in cost, reliable and efficient, simple and compact; it must be durable, easily kept clean, easily operated, and, in addition, continuous in action. There are three types, viz.: 'flash' pasteurizers, retarders, and 'holder' pasteurizers.

'Flash' pasteurization is a process in which the milk is very rapidly heated to a relatively high temperature and then cooled—the action being continuous. It is difficult to maintain a uniform temperature, whilst the relatively small heating area provided in machines built on this 'flash' principle necessitates the raising of the temperature of the heating medium considerably higher than the temperature to which it is desired to raise the milk, with the result that portions of the milk are overheated, if not burnt. Another difficulty is the rapidity with which the milk passes through the pasteurizer—seconds (not thirty minutes). Pathogenic organisms (if present in the milk) may not be all destroyed or rendered inert, owing to the irregular temperatures. This 'flash' form of pasteurizer must be ruled out, as not complying with the requirements set out above.

In the same way and for the same reasons (e.g., irregular temperatures, shortness of exposure to the pasteurizing process, etc.), pasteurization of milk in bottles (air-tight stoppered bottles) is unsatisfactory and, speaking generally, must also be ruled out, as a practical measure. The difficulties in practice in securing a *prolonged* equable temperature and a rapid and trustworthy cooling after pasteurization are insurmountable.

The two other types, viz., retarders and 'holder' pasteurizers, may be considered together, depending, as they do, upon the same principles of a fixed temperature, prolonged application to such temperature, with subsequent rapid and thorough cooling. The retarding or 'holding' process consists of a series of tubes or chambers fitted with baffle plates or cylindrical tanks, the tubes, chambers, and tanks being heated on the outside, so as to keep up at a constant temperature the contained milk for the period of time required. Commercial retarders and 'holder' pasteurizers are difficult to differentiate at times, so much so that the 'holder' is sometimes called a retarder, and vice versa. As already stated, the principle is the same. The retarder receives the milk, which has been previously heated to the pasteurizing temperature, and retards or retains it for the specified time, *if possible*. The holder contains the milk, which may be heated to the pasteurizing temperature in the holder itself. A drawback to the retarder is the difficulty of preventing any of the milk escaping from the retarder before the end of the prescribed time (thirty minutes), due, in part, to convection currents and swirls in the contained milk. Up to date, it may be stated that no retarder apparatus has been placed on the market with a guaranteed 100 per cent efficiency, i.e., a guarantee that no single drop of milk escapes before the allotted time (thirty minutes) has elapsed. Unfortunately, there are retarder apparatuses with as low efficiencies as 20 per cent, the majority—large majority—being not higher than 50 per cent efficiency. So states the official report, leaving no alternative but a

choice of the 'holder' pasteurizer, so as to secure the requirements of efficient pasteurization laid down by the Minister of Health, viz.: a continuous, even temperature of 145° to 150°, a subsequent thorough and rapid cooling of the milk, and the heating for a period of thirty minutes, with continuous action. The plant should be as simple as possible for cleansing purposes, and in all cases furnished with automatic time-temperature recording apparatus.

Too much emphasis cannot be laid upon the fact that a Government department has, at last, spoken in favour of pasteurization. It must not be assumed, however, that pasteurization is the end of the milk question. In the first place, clean milk must be pasteurized, not dirty milk. In other words, there is still the great need for sanitation being rigorously applied to the farms, and the farm employees, the cattle, the methods of transit, and the means of distribution. A reasonable *maximum* 'bacterial content' must be demanded and enforced for pasteurized milk. A pasteurizer must not be regarded as a substitute for sanitation, but as an additional safeguard for the consumers. To secure such a desirable end, the country farms and farmers must be rigorously inspected by the country medical officers of health and their staffs and kept up to a high level of sanitation, so as to secure, as far as possible, clean milk (from a bacteriological and every other standpoint) being placed on the trains and sent into the towns and cities for distribution amongst the millions of consumers, *after efficient pasteurization*.

For ordinary purposes, this is all that is necessary in connection with a milk supply. Superfine methods, however, may be adopted for special milks for infants and children and invalids—the 'certified' and 'Grade A' milks from tuberculin-tested herds, the milk bottled at the farms and non-pasteurized, and with 'bacterial contents' of such a high standard as to be almost impossible to attain and maintain under present conditions.

Condensed and Dried Milks.—The Ministry of Health has recently issued valuable regulations in regard to condensed milk, and also in regard to dried milk—the former (condensed milk) coming into operation on Nov. 1, 1923, and the latter (dried milk) to come into operation on May 1, 1924. The principle involved in each set of regulations is the necessity for the vendors disclosing the contents on labels and ensuring a *minimum* standard for fat and total solids (including fat). Further, an important addendum is that, in cases in which the fat has been abstracted (by machinery or otherwise), the tins or packets must be individually labelled 'unfit for babies'. This last-mentioned is a much-needed reform, as many infants have suffered in the past from being 'starved' upon milks that are practically fat-free, suffering in health and even dying in consequence. In regard to condensed milks, the regulations are to be carried out by the officers of customs and excise in so far as *imported* condensed milk is concerned. In regard to other kinds of condensed milks and all kinds of dried milks (imported or otherwise), the regulations are to be carried out by the officers already appointed under the Sale of Food and Drugs Acts.

The *condensed milk* standards are (a) Full cream, sweetened or unsweetened, 9 per cent milk fat and 31 per cent total milk solids; (b) Skimmed unsweetened, 20 per cent total milk solids; (c) Skimmed sweetened, 26 per cent total milk solids. The *dried milk* standards are: (a) Full-cream milk, 3·6 per cent milk fat and 12·4 per cent total milk solids; (b) Three-quarter-cream milk, 2·7 per cent milk fat and 11·6 per cent total milk solids; (c) Half-cream milk, 1·8 per cent milk fat and 10·8 per cent total milk solids; (d) Quarter-cream milk, 0·9 per cent milk fat and 9·9 per cent total milk solids. Skimmed milk must contain not less than 9 per cent non-fatty solids.

MUMPS.*J. D. Rolleston, M.D.*

SYMPTOMS AND COMPLICATIONS.—In a paper based on the study of 600 cases in soldiers, F. Moutier¹ describes some of the rarer manifestations of mumps. After quoting Comby, who had seen one example, Moutier says that he observed two cases of *inflammation of the sublingual gland*, which rendered movements of the tongue difficult and painful. He also saw a case of *inflammation of the lachrymal gland*, as described by Karth, associated with swelling of both parotid and submaxillary glands, and accompanied by oedema of the lids and swelling of the cheek: the attack was severe and was complicated by supranalitis and pancreatitis, with violent constitutional disturbance and high fever. He also describes a case of *involvement of an aberrant lobe of the parotid*, which was characterized by pain in the cervical region and a rise of temperature on the fifteenth day of the disease. In 9 out of the 600 cases *relapses* occurred from two to three months after the primary attack. Four examples of *mumps rheumatism* were observed, which presented all the features of infective rheumatism and cleared up without leaving any trace. *Adenitis* was found to be more frequent than previous descriptions would suggest. The glands affected were almost always some small nodes situated below the angle of the jaw; occasionally the jugular, and more rarely the occipital, were involved. No violent reactions or suppuration were ever observed.

Moutier examined the *blood-pressure* in 250 cases, with the following results: It was normal during the first few days, but fell considerably towards the third or fourth day, and rose in convalescence, to return to its original level. This fall of pressure was observed in almost all the uncomplicated cases, in association with bradycardia and Sergeant's 'white line', suggesting the possibility of a mild involvement of the suprarenals. Subcutaneous injection of adrenalin caused a considerable rise of pressure.

According to Pilod,² who reports an illustrative case, *phlebitis* is a rare complication of mumps, only five examples having been previously recorded. It may be either a special localization of mumps septicæmia, or, as occurred in his own patient, be secondary to orchitis, the inflammation spreading by continuity from the veins of the vas deferens to those of the lower limb. His patient was an army medical officer, who after double mumps orchitis developed subacute phlebitis of the right lower limb. Five years after the attack the patient still had some oedema of the leg after a long walk or prolonged standing, accompanied by paresthesia in the limb. As in previous cases, the phlebitis did not appear to bear any relation to the intensity of the parotid swelling, which had been remarkably slight, but was probably connected with the quality of the infective agent and the state of diminished resistance. The attack of mumps had been contracted while attending soldiers suffering from a severe form of the disease, and the patient, who was 33 years of age, had undergone the strain of a three years' campaign, and had suffered from bilateral varicocele and slight varicose veins since adolescence.

L. Morquio³ remarks that *meningitis* is a comparatively common manifestation of mumps at Montevideo, while this complication is almost unknown at Buenos Aires. This difference in the course and pathological reaction in adjacent countries has been observed in many diseases. Numerous cases of mumps meningitis have been published in France, but German literature scarcely mentions it.

[Meningitis appears to be equally uncommon as a complication of mumps in Great Britain. The reviewer has for many years been on the look-out for meningeal signs in mumps cases, but has never been able to detect any clinical evidence of meningeal involvement. The practice of lumbar puncture in mumps in the absence of any therapeutical indication, but merely to determine

the presence of a 'meningeal reaction', as is done in some foreign clinics, cannot be too strongly condemned.—J. D.*R.]

S. L. Toemann,⁴ whose observations are based on more than 1200 cases of mumps in soldiers, age from 18 to nearly 50, has formulated the following laws relating to mumps meningitis: (1) Cytochemical meningitis, manifested by changes in the cerebrospinal fluid, is absolutely constant in mumps, and forms an integral part of the disease, the virus of which is essentially neurotropic. (2) The time of its appearance and disappearance varies considerably. It usually occurs early, but sometimes does not develop until late, on the occasion of some complication such as orchitis, or without apparent cause. It is usually fairly persistent, but sometimes lasts only a short time. (3) Clinical meningitis, on the other hand, is by no means constant. In most cases it is entirely absent, and when present is almost always slight. It sometimes appears very early, before any other signs of the disease, but as a rule it develops between the sixth and tenth days after the onset of the parotid swelling, and is almost always of short duration (three to five days as a rule, and ten days at most). (4) Contrary to what is stated by some writers, clinical meningitis and cytochemical meningitis are absolutely independent of orchitis and of one another. A slight clinical syndrome is often associated with a very intense cytochemical reaction, and, inversely, violent clinical symptoms are sometimes accompanied by only a moderate cytochemical reaction.

A. Pitres and L. Marchand⁵ report a case of *polyneuritis* in a soldier, age 20, in convalescence from a mild attack of mumps. The symptoms were: violent pain, followed by paralysis and amyotrophy, in all four limbs, loss of stereognosis and muscular sense, and abolition of all the reflexes. The paralysis disappeared fairly rapidly, and some months after the onset inco-ordination was the principal feature. There was no evidence of syphilis or alcoholism, and mumps was the only infection that could be incriminated. Three similar cases of polyneuritis of quadriplegic distribution have been reported after mumps.

PROPHYLAXIS.—A. Challamel⁶ maintains that the duration of the incubation period in mumps is usually twenty days, and that the period during which the patient is contagious is very short, being sometimes only a few hours preceding the outbreak of the first symptoms, but usually including the first days of the disease. He therefore recommends that persons exposed to infection should continue their normal mode of life for nineteen days after the first exposure but should be isolated for twenty-four hours from the nineteenth to the twentieth day. He considers that this isolation of contacts will be the only effective prophylactic method until mumps 'carriers' can be detected by bacteriological examination.

TREATMENT.—In view of its bactericidal properties, A. Challamel⁷ recommends Colloidal Silver as a prophylactic against mumps orchitis, in doses of 12 to 16 cgrm. daily, given in pills or cachets three times a day. [The variable incidence of mumps orchitis in different epidemics makes it almost impossible to estimate the efficacy of any prophylactic treatment.—J. R. D.].

REFERENCES.—¹*Ann. de Méd.* 1922, 296; ²*Bull. et Mém. Soc. méd. Hôp. de Paris*, 1923, 1070; ³*Jour. Amer. Med. Assoc.* 1922, ii, 1182; ⁴*Med. Science*, 1923, vii, 368; ⁵*Progrès méd.* 1922, 397; ⁶*Bull. Soc. de Thérap.* 1923, 97; ⁷*Ibid.* 166.

MYOCARDIAL INSUFFICIENCY.

Drs. C. Lian and L. Pollet.

(Translated by Carey F. Coombs, M.D., F.R.C.P.)

Just as Widai and his school gave us the physiological conception of syndromes of functional insufficiency of the kidney in place of the anatomical division of chronic nephritis into 'interstitial' and 'parenchymatous', so also,

in the diagnosis of myocardial disease where there is no valvular lesion, it is important above everything to consider the problem from the functional point of view, and to leave the anatomical diagnosis in a secondary place. Often it is wiser, as it is also more practical and nearer to the truth, to label the case as one of myocardial insufficiency rather than to call it, a little too easily perhaps, chronic myocarditis. Why should we seek to make at the bedside an anatomical diagnosis when the grounds for it are so often wanting?

Usually the syndrome of chronic myocardial insufficiency is only one part of a wider symptom-complex. Generally it is found in patients with high arterial tension and albuminuria, or with sclerotic arteries. Often the case is one of what has been called by one of us¹ "polysclerosis of over 50". Some cases are a little difficult to interpret, for the myocardial syndrome may coincide with a normal arterial pressure; but the history gives us reason for the belief that, even if the pressure is now normal, it is so because a cardiac breakdown has brought the pressure down from the high level at which it was originally. It is for such cases that Donzelot² has proposed the picturesque title 'cœur camouflé' of hyperpetics. In a word, it seems as if Fahr³ were right in estimating that the syndromes of chronic myocardial breakdown seen about the age of 50 are in three cases out of four secondary to high arterial tension.

There is, however, a second group of cases where the myocardial syndrome appears without any signs of renal disease or of arterial sclerosis, or of high tension, present or past. This is the condition that one of us has described as the 'isolated form of chronic myocardial syndrome', and that Laubry⁴ has entitled 'myocardies'. Dyspnoea, arrhythmia, gallop rhythm, and after these passive congestion with œdema, betray the inadequacy of the heart. In the absence of any cause of heart stress, such a syndrome must make us think that there are chronic myocardial lesions, but clinically it is difficult to be sure about them; it may be chronic myocarditis, or the train of changes that follows infarction of the cardiac wall; or, again, it may be the mere outcome of a toxic change caused by a process of auto-intoxication, the nature and even the existence of which may escape observation.

In any case, whether there be hypertension or no, Digitalis and also Ouabain are of great service to these patients, used in conjunction with Theobromine, Bleeding, Purgation, and a Diet with low nitrogen content and little or no chlorides.

REFERENCES.—¹C. Lian, article "Cœur" in *Traité Sergent*; ²*Presse méd.* 1922, Aug. 22; ³*Jour. Amer. Med. Assoc.* 1923, April 7; ⁴*Thèse Giroux*, Paris, 1923.

MYOMATA, UTERINE. (See UTERUS.)

MYOSITIS OSSIFICANS.

Sir W. I. de C. Wheeler, F.R.C.S.I.

Lewis¹ discusses this subject, and in dealing with the circumscribed form of myositis mentions three varieties: (1) The traumatic; (2) The non-traumatic; (3) The neurotic form, usually associated with arthropathies or fractures occurring in tabes, etc.

The writer refers to *circumscribed myositis ossificans developing in incised abdominal wounds*, and thinks the condition is the result of metaplasia of connective-tissue cells. He observed two cases in which bone developed in incisions of the abdominal wall. It is striking how many such cases have followed operations on the stomach, either a gastro-enterostomy or resection.

REFERENCE.—¹*Jour. Amer. Med. Assoc.* 1923, May, 1281.

NAIL, TUMOURS OF. (*See also* WHITLOW, MELANOTIC.)*E. Graham Little, M.D., F.R.C.P.*

Sutton¹ describes two cases, very similar clinically, of small swellings of the nail bed, identification of which with any recognized disease was impossible. In both cases the first change noted was a rounded painless nodule at the base of the nail, of the left thumb in the first case, of the right forefinger in the second. At the same time a V-shaped groove in the nail, extending from the matrix to the free margin, was noted. The tumour was excised in the first case and examined histologically. It was difficult to say anything definite about the appearances, and its character remains indeterminate. In the second case the swelling disappeared after one treatment with radium.

REFERENCE.—¹*Arch. of Dermatol. and Syph.* 1922, Sept., 351.

NASAL SINUSES. (*See* OPTIC NERVE, AFFECTIONS OF.)**NEEDLES, STERILIZATION OF.***Herbert French, M.D., F.R.C.P.*

A simple method for sterilizing needles used for transfusion or venepuncture is given by Pierre Paul Lévy.¹ **Paraffined Chloroform** is the agent used, and is prepared according to the formula: Paraffin, 3 gm.; chloroform, 100 c.c. Histological paraffin is used, cut into small pieces, and its solution hastened by warming in an incubator at 37°, or, failing this, by immersing the flask in warm water.

In the case of an unused needle, the wire is withdrawn and the needle is placed point downwards in a sterilized tube. Paraffined chloroform is then poured in so that the butt of the needle is covered. If the needle has been used before, it is cleaned by first of all syringing water through it, then 2 c.c. of 95 per cent alcohol, and lastly 2 c.c. of chloroform, after which it is immersed in the mixture of paraffin and chloroform. An hour's immersion is considered sufficient for sterilization, but needles can be left in the solution indefinitely. The needle is taken from the solution with a flamed pair of forceps, and dropped point downwards into a sterile tube which is corked with sterile wool. The tube is then turned upside down and allowed to remain so for some minutes, during which the excess of chloroform is absorbed by the wool plug. It is then turned right way up again, and the remaining chloroform is allowed to evaporate at room temperature, or this can be hastened in an incubator at 37°.

The advantages of this method are that neither rusting nor blunting occurs, that no special apparatus is necessary, and that the interior of the needle is left with a thin coating of paraffin which renders any clotting unlikely.

REFERENCE.—¹*Presse méd.* 1921, Sept. 28, 777.

NEPHRITIS. (*See* RETINA, DISEASES OF.)**NERVES, PERIPHERAL, SURGERY OF.** (*See also* SCIATICA.)*J. Ramsay Hunt, M.D.*

Re-suture of Peripheral Nerves.—Stopford¹ considers the question of re-suture in patients who have received no benefit from the original suture and when it becomes necessary to decide whether to advise the patient to submit to re-suture, or to consider the condition as irreparable. This subject is of greatest importance in connection with the ulnar or median nerve, since in the case of the musculospiral, or even the sciatic, alternative orthopædic measures offer such good functional results that a re-suture rarely needs to be entertained.

During the last five years he has had the opportunity of observing the results of re-suture in 14 patients, the nerves affected being: median 5; ulnar 7;

musculospiral 1; external popliteal 1. The principal features to be noticed in the fourteen patients are recorded briefly in the following table:—

RESULTS OF RE-SUTURE IN 14 PATIENTS.

Note.—P.R.T. = Pronator radii teres; F.S.D. = Flexor sublimis digitorum; F.P.D. = Flexor profundus digitorum; F.L.P. = Flexor longus pollicis; F.C.U. = Flexor carpi ulnaris; A.M.D. = Abductor minimi digiti.

Case No.	Nerve Injured	Site of Injury	Interval between Date of Injury and Re-suture	Probable Cause of Failure after First Operation	Result of Re-suture
1	Musculo-spiral	Arm	40 months	Sepsis and intra-neural fibrosis	Failure
2	Median	Elbow	13 months	Separation of ends	P.R.T., F.S.D., F.P.D., F.L.P. show voluntary power. Slight recovery of analgesia
3	Median	Forearm	33 months	Intraneural fibrosis	Failure. Amputation of hand subsequently
4	Median	Wrist	26 months	?	Recovery of analgesia and some recovery of anaesthesia
5	Median	Arm	14 months	?	All muscles show voluntary power. Recovery of analgesia
6	Ulnar	Arm	14 months	?	F.C.U., A.M.D., inter-ossei show voluntary power. Recovery of analgesia
7	Ulnar	Arm	14 months	?	F.C.U., F.P.D., A.M.D. show voluntary power. Some recovery of analgesia
8	Ulnar	Forearm	34 months	Bad technique	Failure
9	Ulnar	Elbow	35 months	Intraneural fibrosis	Failure
10	Ulnar	Axilla	21 months	Intraneural fibrosis	F.C.U., F.P.D. show voluntary power
11	Ulnar	Arm	17 months	Sutures broke away	F.C.U., F.P.D. show voluntary power
12	Median	Forearm	72 months	Intraneural fibrosis	Failure
13	Ulnar	Forearm	23 months	Nerve-graft	F.C.U., F.P.D. show voluntary power. Recovery of analgesia
14	External popliteal	Thigh	45 months	Intraneural fibrosis (6 inches resected at re-suture)	Failure

From an analysis of this series he concludes:—

1. Regeneration may occur, under favourable conditions, after the re-suture of a peripheral nerve.

2. The end-results after successful re-suture are similar to those observed after a successful secondary suture.

3. The causes of failure seem to be the same as in secondary suture, with the addition of: (a) Greater disturbance of the intraneural anatomy by the further resection; (b) The effect of a third injury to the nerve-fibres upon the cells in the anterior cornu and posterior ganglia.

4. Excluding complications, re-suture is contra-indicated: (a) When more than three years have elapsed since the time of the reception of the injury to the nerve; (b) When extensive intraneural fibrosis has been encountered at the first operation.

5. The imperfect recovery of function and sensation, which is almost invariably found, even under the most favourable circumstances, after secondary suture or re-suture, is chiefly due to: (a) Disturbance of the internal anatomy of the nerve-trunk; (b) Intraneural fibrosis.

REFERENCE.—¹*Brit. Jour. Surg.* 1922, Oct., 216.

'NERVOUS HEADACHE.'

Sir James Purves-Stewart, K.C.M.G., C.B., F.R.C.P.

Calcium Treatment.—Baastrup,¹ of Copenhagen, reports experiences which seem to justify tentative treatment by calcium of all cases of rebellious headache for which no definite cause can be identified. In some patients of this class there was a tendency to recurrent attacks of angioneurotic oedema; this suggested that the headache might be due to an intracranial extension of the same process and that calcium would be a logical treatment. A family predisposition was always evident in this group. The symptoms of recurrent puffiness of the eyelids and lips and other manifestations of angioneurotic oedema were accompanied by severe headache. The portrait of the grandfather of one of Baastrup's patients showed the same puffiness under the eyes. Baastrup gives Calcium Lactate, 15 gr., three times a day for three weeks, and then, after progressively longer intervals, for periods of ten days. His results were excellent. The oedema and headaches subsided. In other cases, again, no cause could be discovered for the 'nervous headaches', but the calcium tablets proved equally effectual. Tofte² confirms Baastrup's statements, and records an instructive case of rebellious headache after abortion. The blood showed an excess of lymphocytes. Under calcium the general health steadily improved, and a normal pregnancy followed. The calcium treatment was maintained throughout the pregnancy, and only once was there a transient threatening of headache.

REFERENCES.—¹*Ugeskr. f. Læger*, 1923, Feb. 1; ²*Ibid.* Feb. 8 (abstr. in *Jour. Amer. Med. Assoc.* 1923, April 7, 1038).

NEUROSYPHILIS, TABES, AND PARALYTIC DEMENTIA. (See also GENERAL PARESIS.)

Sir James Purves-Stewart, K.C.M.G., C.B., F.R.C.P.

The relatively easy response of meningovascular syphilis to antisyphilitic remedies such as mercury, salvarsan, and iodides, as contrasted with the singular resistance of tabes and, still more, of paralytic dementia, has long been a familiar observation by neurologists. Various explanations have been offered for this fact, the most plausible theory being that, once the spirochaetes and their toxins have gained access to the closed circulation of the cerebrospinal fluid, the spirochæte is almost inaccessible to remedies such as mercury or arsenic, which pass with great difficulty or not at all through the choroid plexuses and thus fail to reach the cerebrospinal fluid. This is one of the reasons which has encouraged some physicians to persevere with direct intrathecal medication in addition to remedies given by the ordinary channels.

Recently Lowry, Lowenhart, Blackman, and Hodge, of Wisconsin,¹ have published a series of cases of paralytic dementia, 54 in all, in which they claim encouraging results by the administration of **Tryparsamid** intravenously, combined with **Mercury** intramuscularly, without any intrathecal medication. Their treatment consists in dissolving 3 grm. of tryparsamid in 10 c.c. of freshly-distilled water and injecting the total amount intravenously: this solution is injected at intervals of a week for eight successive weeks. At the same time neutral mercuric salicylate is administered by intramuscular injection in 1-gr. doses. The mercury is given three days before each dose of tryparsamid, and a total of nine such injections, alternating with the eight injections of tryparsamid, comprises a course. A rest is then given of from five to eight weeks, when a second course is undertaken. After this second course and a period of rest, if there is continued evidence of clinical activity of the disease, or if the case is still serologically positive, a third course is given.

The Wisconsin observers claim that out of a total of 54 cases of paralytic dementia, 28 were discharged from the hospitals and have been able to return to work, for periods varying from six months to two years. Whether these will prove to be cures or only remissions, time alone will show. It is interesting, however, to note that workers in the United States Public Health Services, after an experimental investigation regarding the penetration into the cerebrospinal fluid of tryparsamid and other arsenical salts, found that tryparsamid was more permeable than salvarsan or neosalvarsan, and that it was more efficient in destroying trypanosomes and the *Spirocheta pallida*.

It has long been a matter of clinical experience that general paralytics are often benefited as regards their symptoms if they happen to become infected by an intercurrent acute fever such as erysipelas or enteric fever. To inoculate a patient with a serious specific fever of this sort, however, is rarely practical or judicious. Other means have accordingly been suggested to induce an artificial pyrexia accompanied by leucocytosis, production of antibodies, and other blood changes, all of them admittedly 'unspecific', as a consequence of which it is hoped to modify and perhaps even to destroy the syphilitic organism and its toxin. For this purpose Wagner v. Jauregg² some years ago began to treat cases of paralytic dementia by repeated hypodermic injections of Koch's **Tuberculin**. A sufficient quantity was given to induce a temperature of about 102°. Beginning with doses of 0.5 to 1 mgrm., the dose was raised after a couple of days' interval to 5 or 7 mgrm., and then gradually to 10, 20, or even 30 mgrm. Von Jauregg claimed that in this way complete remissions, allowing of the patient's return to work, were frequently obtained. In the majority of instances, however, the symptoms ultimately returned. Subsequently, hypodermic injections of **Besredka's Typhus** (i.e., **Enteric Fever**) **Vaccine** were employed for the same purpose. Nevertheless it was observed that more striking improvements occurred in patients who had accidentally developed infections such as pneumonia, erysipelas, or suppurating foci.

In 1917 Wagner v. Jauregg began to inoculate cases with benign tertian **Malaria**. Of the first 9 cases, 3 were said to be actively and effectively at work in 1922. Since 1919 this method has been used by him in Vienna as a routine. The original subject from whom the strain of malaria was obtained was a patient in whom no quinine treatment had been employed. With this strain von Jauregg has since inoculated some 200 cases. From 2 to 4 c.c. of blood are taken from a previously inoculated general paralytic, during the interval between two malarial attacks, and immediately injected into the patient to be treated subcutaneously or intravenously. After an incubation period varying from six to thirty-six days (shorter after intravenous than after subcutaneous inoculation), typical attacks of benign malaria appear. The patient is allowed to

have from ten to twelve of these without treatment; then quinine is given to cut them short, in doses of 1 grm. for three days in succession, then in doses of 0.5 grm. for fourteen days. It is found that the attacks, although otherwise typical, soon become quotidian; that they are much more amenable to quinine, and the patients are curiously immune from relapses, contrasting with malaria directly acquired in the ordinary way from an infected *Anopheles* mosquito. Parallel with the quinine treatment, weekly doses of *Neosalvarsan* are given, 0.3, 0.4, and four of 0.6 grm. The routine adoption of this method requires that there shall always be available a patient already inoculated from an earlier individual in the series, or alternatively that there is malaria in the district in which it is proposed to use it. In the latter case, blood should be secured from a subject who has not already been treated by quinine.

In early cases of paralytic dementia a remission of the symptoms is often observed. In von Jauregg's series of cases, he claims to have secured prolonged remissions in over 50 per cent. Improvement sets in gradually after the malarial attacks have ceased. The patient's physical condition improves, epileptiform attacks and speech disturbances cease, and the patient sometimes becomes able to resume his ordinary life. It is noteworthy, however, that the Wassermann reaction in the blood and cerebrospinal fluid is not modified by this method of treatment.

Another method of inducing artificial pyrexia is by means of repeated large intramuscular injections (50 to 100 or 150 c.c. of a 2 per cent solution) of *Sodium Nucleinate*, at intervals of three or four days, as specially studied by Donath.³ During 1913-14 Purves-Stewart⁴ made a number of observations on this method of treatment, but with only moderately encouraging results. Remissions in the mental symptoms were obtained, together with a diminution in the lymphocytosis of the cerebrospinal fluid, lasting for three to fifteen months; but in none of his six cases was there a permanent cure. Nor has Donath himself recorded any instance of permanent return to normal.

More recently Fischer and Wiechowski⁵ have employed a nucleo-proteid substance named 'Phlogetan', which is injected, either subcutaneously or intramuscularly, in doses of 2 to 5 c.c. at intervals of two to four days. They claim that its action is more intense than that of nuclein, that like nuclein it produces a leucocytosis, but without notable pyrexia; the pulse-rate, however, is increased. They advise pushing the injections until a total of 50 to 70 c.c. have been given. They claim results similar to those obtained by nuclein, both in paralytic dementia and in tabes. Their best results (and Fischer in a later publication⁶ claims improvement in 67 cases out of 81 tabetics, i.e., in four-fifths of his cases) have followed combined treatment with *neosalvarsan* and *phlogetan*, and it seems wiser to use this combination than to depend on *phlogetan* or nuclein injections alone.

Dercum⁷ is of opinion that whatever good results have been obtained by intraspinal therapy (which we shall presently discuss) are mainly due to the withdrawal of diseased cerebrospinal fluid. He has accordingly introduced the treatment of paralytic dementia by simple **Drainage of Cerebrospinal Fluid**, sometimes by itself, sometimes combined with intravenous *salvarsan* and mercurial inunctions. The basis of this procedure is the hope that drainage washes out the syphilitic toxin from the subarachnoid spaces and cisternæ. It also lowers the tension of the cerebrospinal fluid and leads to increased secretion of fluid by the choroid plexuses at a time when the blood contains the arsenical remedy. In a series of 13 cases of tabes and general paralysis, Craig and Chaney⁸ have recorded their experiences by this method. The patient, immediately after intravenous administration of *salvarsan*, lies on his side, and lumbar puncture is performed. Fluid is allowed to escape until 15 to

80 c.c. of fluid have been withdrawn. As many as twelve weekly drainages are carried out in a single case. So far as can be judged by the authors' tables, the lymphocytosis of the fluid usually diminishes, but the globulin reaction and Wassermann reaction are relatively unaffected.

With regard to the **Intraspinal Therapy** of neurosyphilis, including tabes and general paralysis, considerable differences of opinion have arisen amongst various neurologists. Thus, for example, Kaliski and Strauss⁹ condemn intraspinal therapy in paralytic dementia, a conclusion with which Purves-Stewart's results are in agreement. On the other hand, they regard the intraspinal treatment of tabes by salvarsanized serum as of doubtful value, and in support of their conclusion contend that the amount of arsenic present in salvarsanized serum is infinitesimal in amount and of no spirochaeticidal value. They do not appear, however, to take into consideration the probability that it is not merely the arsenic *per se* but the antibodies which it calls forth that are the therapeutically active agents in the injected serum. Purves-Stewart obtained highly encouraging results in a series of 44 cases of tabes by the regular administration of salvarsan intravenously, combined with salvarsanized serum intrathecally. His clinical and serological results have been so encouraging that he does not feel justified in discarding the method for tabes and cerebrospinal syphilis, although he excludes paralytic dementia. This conclusion is supported by Schaller and Mehrtens,¹⁰ who compared a series of 14 cases of tabes, 11 cases of cerebrospinal syphilis, and 1 case of paralytic dementia treated by intravenous and intramuscular therapy alone, with another series of 42 tabetics, 21 cases of cerebrospinal syphilis, and 12 cases of paralytic dementia treated intraspinally by salvarsanized serum. They are of opinion that intraspinal treatment is definitely superior to intravenous and intramuscular methods alone, especially in its effectiveness in clearing up the cerebrospinal fluid; 48 per cent of their cases became clear through the use of intraspinal methods, as compared with 19 per cent with the old intravenous method. The most promising cases for intraspinal therapy are those of meningovascular syphilis. Of the parenchymatous group, tabetic cases are relatively the most favourable, while paralytic dementia and optic tabes are generally unfavourable.

The lumbar region, although the easiest, is not the only route through which remedies may be introduced directly into the cerebrospinal fluid. Substances introduced by the lumbar route have a long distance to traverse before reaching the cranial cavity, and even then only a part of the injected fluid reaches the brain. It is therefore readily understood why intraspinal treatment, though often efficacious in spinal syphilis and in tabes, is much less efficient in cerebral syphilis and in paralytic dementia. Accordingly, Neisser and Pollack suggested a method of **Cranial Puncture** by drilling through an area of frozen scalp, perforating the subjacent cranium, and injecting the remedy beneath the dura directly on to the surface of the brain. This has been carried out by Marinesco and Minea,¹¹ by Sicard and Reilly,¹² and others, but as a routine method it does not appeal to the ordinary clinician. Another plan is to enter the basal subarachnoid cistern through the orbit, penetrating the **Sphenoidal Fissure** with a hollow needle, as proposed by Beriel,¹³ of Lyons. This, however, is an awkward procedure, and involves a risk of wounding the cavernous sinus. A more straightforward procedure is to do a frank trephining operation close to the middle line of the vertex, and then inject the salvarsanized serum directly into one or other lateral ventricle by the so-called '**Balkenstich**' of Anton and Bramann, which consists in perforating the corpus callosum. The results hitherto obtained by this procedure, which has been tried both in Germany and in England in a small number of cases, have not been sufficiently good to encourage its continuance, more especially as the symptoms of paralytic

dementia are essentially cortical, and the cortex can be reached by a less round-about route than the lateral ventricle, and without damage to the brain structures.

The method of **Intracisternal Puncture** through the occipito-atlantoid ligament, as described originally by Wegeforth, Ayer, and Essick,¹⁴ offers certain advantages. Cisternal puncture, once the necessary technique is mastered, is carried out as readily as lumbar puncture. Fluid thus introduced into the cisterna magna is carried forwards in the current of the cerebrospinal fluid through the basilar or interpeduncular cistern to the cisterna terminalis beneath the anterior end of the corpus callosum. On each side the fluid flows upwards and outwards along the middle and anterior cerebral arteries respectively, and is conducted to the cerebral cortex. It thus permeates the subarachnoid space from base to vertex, reaching every part of the cortex. Curiously enough, one finds that the amount of discomfort to the patient is less than after an ordinary lumbar puncture, and in particular the headache which is so common after lumbar punctures is absent after cisternal puncture. The clinical results obtained by intracisternal administration of **Salvarsanized Serum** have sometimes been striking. Purves-Stewart¹⁵ records a series of 6 cases of neurosyphilis, including three of early paralytic dementia. Two of his patients with early cerebral syphilis were rapidly benefited. Not only did they lose their clinical symptoms, but the cerebrospinal fluid returned to a normal condition. With regard to early paralytic dementia, the number of cases thus treated is not yet enough to justify definite conclusions. So far, the results have been encouraging in that a rapid remission has usually been obtained both in the mental symptoms and in the condition of the cerebrospinal fluid. The cases which are most likely to benefit are those in the earliest recognizable stage of the disease, long before they have reached the stage of certifiable insanity, i.e., patients in whom the cortical changes are as yet slight, although the cerebrospinal fluid already shows well-marked syphilitic changes. Early diagnosis during the pre-paralytic stage is thus an essential preliminary for hopeful treatment. No method of treatment, however, can be expected to replace destroyed nerve-cells in the central nervous system.

The following maxims have been laid down by Purves-Stewart with regard to the treatment of neurosyphilis, including tabes and paralytic dementia:—

1. Every case of neurosyphilis, diagnostically established by combined clinical and serological tests, demands assiduous treatment of the general syphilitic infection by every means at our disposal. Antisyphilitic remedies, including mercury, iodides, arsenobenzol, etc., are to be administered by the most efficient route, whether by the mouth, by inunction or fumigation, by intramuscular injection, or by intravenous injection into the blood-stream. In no case should our remedies be directed exclusively to the nervous system.

2. In gummatous and meningovascular neurosyphilis the foregoing anti-syphilitic treatment is usually all that is necessary.

3. Some cases of parenchymatous syphilis respond, but the majority are resistant, to general antisyphilitic treatment, even when carefully and thoroughly carried out. Such cases are those which should be selected for supplementary subarachnoid treatment, whether intrathecal or intracisternal.

4. Intraspinal treatment by salvarsanized serum prepared from the patient's own blood, or by human or horse serum mercurialized *in vitro*, is specially suitable for cases of tabes and of cerebrospinal syphilis, provided the cerebrospinal fluid shows evidences of active meningeal reaction. It is also suitable for meningovascular spinal syphilis when resistant to ordinary treatment.

5. The direct intraspinal administration of arsenobenzol into the cerebrospinal fluid is liable to produce acute softening of the spinal cord, and should be discarded.

6. Cases of general paralysis, of optic tabes, of tabo-paralysis, and of tabes with negative reactions in the cerebrospinal fluid, are not likely to benefit by intraspinal treatment.

7. Cases of meningovascular cerebral syphilis benefit much by intracisternal administration of salvarsanized serum.

8. General paralysis, if recognized in the early stage, is definitely benefited by intracisternal treatment. This method is superior in efficacy to intraventricular operations, and entails much less risk to the patient.

9. Pyrexial treatment of early general paralysis—for example, by tuberculin, phlogetan, nuclein, or by benign malarial infection—may induce remissions in the disease. So also can simple drainage of the cerebrospinal fluid. Both of these 'unspecific' methods should be combined with general antisyphilitic treatment.

10. Advanced cases of general paralysis, with extensive destruction of cortical nerve elements, are hopeless for curative treatment by any method whatever.

REFERENCES.—¹*Jour. Amer. Med. Assoc.* 1923, May 26; ²*Psycho-neurol. Work.* 1918-19, xx, Nos. 21, 22; ³*Berl. klin. Woch.* 1910, Dec. 19; ⁴*Brit. Med. Jour.* 1914, May 2; ⁵ref. in *Zentralb. f. Neurol. u. Psychiat.* 1922, May, 553; ⁶*Wien. klin. Woch.* 1923, May 24, 376; ⁷*Arch. of Neurol. and Psychiat.* 1920, iii, 230; ⁸*Jour. Nerv. and Ment. Dis.* 1922, lvi, 97; ⁹*Arch. of Neurol. and Psychiat.* 1922, vii, 98; ¹⁰*Ibid.* 89; ¹¹*Revue neurol.* 1914, 337; ¹²*Soc. méd. des Hôp.* 1913, Dec. 19; ¹³*Neurol. Centralb.* 1914, 21; ¹⁴*Amer. Jour. Med. Sci.* 1919, June, 789; ¹⁵*Brit. Med. Jour.* 1922, Oct. 7.

NEW-BORN, ARRESTED RESPIRATION IN.

Frederick Langnead, M.D., F.R.C.P.

G. F. Still¹ draws attention to a variety of respiratory failure differing from asphyxia neonatorum and so-called extra-uterine asphyxia, and occurring not only within the first few days after birth, but sometimes in infants some weeks old. It presents the following general features summarized from his study of five cases. "An infant, aged it may be a few hours or it may be a few weeks, has given rise to no anxiety; the labour perhaps was normal, there was no asphyxia at birth, and all seems going well when the infant . . . is found leaden-coloured or pale, having entirely ceased to breathe; artificial respiration starts the infant breathing again, and by the time the doctor arrives the whole upset sounds like a false alarm, the infant is lying placidly in its cot, with a good colour, breathing perfectly comfortably. . . . But in a few hours the infant is again found in the same condition; without the slightest sign or warning respiration has stopped, and only by prompt artificial respiration is life again saved. So the story goes on for a day or two, and then probably in one of the attacks breathing cannot be restored and the infant dies." In one case the attacks began at 4 weeks, in another at 4 weeks and 5 days from birth; the others were first affected at about 16 hours, 26½ hours, and 5 days respectively. The character of the labour was noted in only two instances, in neither of which had instruments been used, though it was protracted in one of them. The infants were not necessarily feeble or ill-nourished, nor was asphyxia at birth a necessary antecedent. Four of the five were boys. The place in the family was noted in three: they were the fourth, fifth, and eighth children respectively. The attacks came on silently without apparent reason, the infant simply ceasing to breathe abruptly and completely. One fatal case was exceptional in that the inspiration gradually became slower, then ceased, and returned gradually after an interval of one and a half minutes. Between the attacks the colour was perfectly good; during them cyanosis seemed to synchronize with the arrest of respiration. The heart continues to beat steadily for some time after respirations cease, and its beat is strong and healthy between the attacks. The number of attacks varies greatly. Only one of the five cases

recovered. He points out that these attacks have an obvious medico-legal bearing, since death in a first attack might easily be attributed to overlying or some more sinister cause.

Two post-mortem examinations were made. One showed a certain amount of collapse of the pulmonary bases and probably a very early bronchopneumonia, but the attacks had occurred several times daily for seven days before death, so that the lung condition was as likely to be the result as the cause of the attacks. In the other case there was more extensive atelectasis, the greater part of the right lung and part of the left lower lobe being atelectatic, but whether this was cause or effect must be uncertain. The infant had several attacks daily from 5 days old, and died at 15 days. The appearance of the attacks, their sudden onset, and the good condition of the infant during the intervals suggested rather some affection of the respiratory centre than a secondary asphyxia from insufficient expansion of the lungs.

TREATMENT.—The infant should be watched closely night and day until the attacks have been absent for some days. Artificial respiration may become imperative at any moment, and the nurse or mother must be instructed accordingly. Oxygen probably helps in re-establishing respiration.

REFERENCE.—¹*Lancet*, 1923, i, 431.

NEW-BORN, DISEASES OF. (*See* ICTERUS NEONATORUM; NEW-BORN, ARRESTED RESPIRATION IN; PYLORUS, CONGENITAL HYPERTROPHY OF; SYPHILIS, CONGENITAL.)

NEW-BORN, HÆMORRHAGES IN THE.

Frederick Langmead, M.D., F.R.C.P.

The appeal made by Little¹ in 1862 that obstetricians should make a close investigation into the cause of death in children still-born or dying shortly after death, with a view to a possible modification of their practice, has found little response until comparatively recently, though there have been notable exceptions, such as the investigation by Herbert Spencer more than thirty years ago. Little's paper has become classical, and the effects of intracranial birth injury and hæmorrhage in children who survive and suffer from spastic paralyses have passed into the literature as Little's disease. It will be remembered that Little ascribed the disturbances of function occurring in that disease chiefly to intracranial hæmorrhage arising from birth injury, but was of opinion that asphyxia neonatorum without further injury might be responsible for some cases. Our knowledge of hæmorrhage in still-born and new-born children has advanced since then, and it is now customary to divide them into true birth hæmorrhages and spontaneous hæmorrhages due to the so-called 'hæmorrhagic diathesis of the new-born', first dealt with fully by Townsend² in 1891. Neither of these groups includes hæmophilia (a very occasional cause of bleeding at this period), bleeding associated with sepsis, including epidemic hæmoglobinuria, or a possible group, certainly rare, in which syphilis is the direct cause, and to which Hess³ drew attention in 1904.

John N. Cruickshank,⁴ in a recent research, has studied chiefly the hæmorrhages associated with congestion and asphyxia at birth. As he points out, they are of frequent occurrence, and have escaped the consideration which they merit, although they were fully described in 1892 by Spencer, whose findings were almost identical with those recorded by recent writers. Cruickshank holds that asphyxia and congestion alone may be responsible for severe hæmorrhage, including bleeding into the viscera, quite apart from the additional trauma of labour, as is shown in cases of maternal death due to concealed accidental hæmorrhage when labour pains have not occurred. When to these

are added the extreme congestion due to uterine contractions and to pressure by the maternal passages, the risk of gross hæmorrhage is greatly increased. Apart from these congestion cases, whether accompanying labour or not, are the forms of bleeding produced by trauma superimposed on asphyxial congestion ; to these belong most of the gross examples of intracranial and visceral hæmorrhage ascribed to pressure on the maternal parts and to obstetrical interference. His observations lead him to infer that asphyxial congestion is the essential element in the production of hæmorrhage, that increase of this congestion by the pressure of the maternal passages is the next most important factor, while injuries due to abnormal presentations or to operative interference occupy the third, though an important, place in the etiology. That severe intracranial and visceral hæmorrhage is often due to intranatal injury has been shown by Holland,⁵ who found hæmorrhage in 51 per cent of infants dying as the result of difficult labour, and that in one-half of these cases the tentorium cerebelli was torn. Similarly F. J. Browne⁶ has shown the frequency of injury to the dura. Cruickshank, though finding the incidence of these lesions less frequent than these two observers, still found it sufficiently often to make them rank among the important birth injuries.

Together with Professor Kennedy, Cruickshank has examined 200 mature infants, and found hæmorrhage to a greater or less degree in 154 (77 per cent) ; if allowance be made for certain craniotomy cases the incidence of hæmorrhage was approximately 80 per cent. In 55 there were capillary oozings or petechiæ merely, and gross hæmorrhages in 99 (50 per cent). In 65 there were severe meningeal hæmorrhages, accompanied in 21 cases by gross visceral hæmorrhage. In 34 visceral hæmorrhage occurred without meningeal hæmorrhage ; but of these, 8 were cases of craniotomy. Two hundred premature infants, born during the eighth or ninth month, were also examined : hæmorrhage was found in 133 cases (66·5 per cent) and gross hæmorrhage in 81 (40 per cent). The chief difference between the incidences of hæmorrhage in mature and premature infants was that only 20 per cent of the former were free from hæmorrhage, while 35 per cent of the latter escaped ; the incidence of meningeal hæmorrhage was the same in both. Tentorial injuries were less common, occurring in only 20 per cent, but were also more frequent in the mature fœtus. An important point was that there occurred a 20 per cent excess of still-births in premature infants with meningeal and visceral hæmorrhages over the still-births in the corresponding number of mature infants. The figures make it appear evident that many infants with quite extensive birth hæmorrhages survive. In many of those investigated, death was brought about by quite independent disease.

A good deal of interest has been taken recently in the hæmorrhages of new-born children which cannot be attributed to birth injury or asphyxia, and which are for the most part included under the term 'hæmorrhagic disease'. Melæna neonatorum, umbilical hæmorrhage, hæmatemesis, purpura, suprarenal hæmorrhage have long been recognized as its chief manifestations, but only lately has the frequency of intracranial hæmorrhages from this cause been suspected.

A. D. Kaiser⁷ finds it difficult to compute the proportion of spontaneous hæmorrhages to those produced by trauma, but indicates the frequency with which it occurs in labours which have been easy ; in his opinion it is as common after easy as after difficult labour. He advises the early injection of **Blood Serum** or **Prothrombin**, and in intracranial hæmorrhage the early use of **Spinal Puncture** and hypodermic injection of serum.

D. Munro and R. S. Eustis⁸ have reviewed extensively the literature on intracranial hæmorrhage of the new-born, and conclude that its diagnosis should be based on the history and physical examination, the measure of the intracranial pressure by a spinal manometer, and the coagulation and bleeding

times. The treatment depends upon recognition of the etiology in a particular case and upon the intracranial pressure. When it is due to the hæmorrhagic disease they recommend the administration of **Normal Whole Blood** subcutaneously until the bleeding and coagulation times have become normal, followed by measures for relieving the intracranial hypertension. For traumatic cases the treatment consists of prompt elevation of the depressed fractures, and the relief of intracranial pressure by drainage by lumbar or ventricular puncture or by subtemporal decompression. Relief of intracranial pressure by these measures is also indicated in the 'asphyxia' cases. Corrective surgical procedures they hold to be impossible, since the pathological lesion in the new-born cannot be accurately localized.

For spontaneous hæmorrhage at this age, F. H. Falls⁹ regards **Transfusion** as a specific, and advocates the **Citrate** method, and the choice of a peripheral vein, especially the external jugular, in preference to the longitudinal sinus.

While considering the relationship of these hæmorrhages, however produced, in the newly born to 'Little's disease', we must not lose sight of the fact that not all cases of spastic paralysis dating from birth or soon afterwards are so produced. Inflammatory lesions such as meningitis or encephalitis in uterine or early extra-uterine life have probably been inculcated too often, the inflammatory changes found being generally secondary to hæmorrhage. A proportion, too, is due to developmental defects, as J. Collier¹⁰ has shown. H. C. Cameron and A. A. Osborn¹¹ have studied the ultimate effect upon the child's mental development of meningeal hæmorrhage occurring at birth, and have come to the following conclusions: (1) Among cases of infantile diplegia and paraplegia it is possible to recognize a group in which the defect is confined to the sensorimotor cortical areas. (2) Probably all cases in this group are due to birth injury, although all cases of birth injury may not belong to the group. (3) Since education at first proceeds almost entirely by sensorimotor paths, there is in early childhood a deceptive appearance of gross mental defect. (4) In later childhood progress may be rapid and recovery almost complete. The difficulty is overcome by the remarkable persistence in effort which is characteristic of most of these children. Even when voluntary movements remain stiff and awkward, the child may be a quick learner by eye and ear. Inco-ordination may remain, though character and intelligence may be on a high plane.

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NOSE, AFFECTIONS OF.

A. J. M. Wright, M.B., F.R.C.S.

NASAL DEFORMITY.

War injuries have directed attention to the surgical treatment of deformities, and the advances resulting are being adapted to civil practice. Nasal deformities are frequently due to injury, and in such cases the deformity usually present is a depression, with or without lateral displacement of the nasal bones, together with fracture and displacement of the cartilaginous and bony septum. In the case of recent injuries, the displacement can usually be corrected by manipulation, thus avoiding the need for further operation. Such manipulative treatment can be effectively carried out during a period of at least one week following the injury, and is also usually successful up to a fortnight. The necessary manipulation should be done under a general anæsthetic. The septum should first be straightened with flat-bladed forceps (Adam's septal forceps), and the nasal bones raised by pressure from within the nose

PLATE XXXVI.

NASAL DISFIGUREMENT AND ITS CORRECTION

(DOUGLAS GUTHRIE)



Case 1.



Case 2.



Case 3.

and any lateral displacement corrected. It is important thoroughly to mobilize the fragments, and they can then be kept in position by lightly packing the nasal passages and applying externally either a light metal splint or simply a strip of strapping. Intranasal packing should be allowed to remain for two or three days.

According to Guthrie,¹ the most frequent type of nasal deformity is defect of the bridge, or saddle nose. The most common cause is injury, lupus and syphilis accounting for the majority of the remainder. Methods of **Cartilage Grafting** have entirely replaced the use of paraffin injections for these cases. Submucous resection of the septum is not infrequently necessary also, and the cartilage so obtained may sometimes be used as a graft to treat the external deformity. Failing this, costal cartilage is used. He inserts the graft through a transverse incision at the root of the nose. The soft tissues are raised from the bone and cartilage down to the tip, and the portion of cartilage, which

DESCRIPTION OF PLATE XXXVI.

Case 1.—Injury to nose from a fall at age of three. Treated by costal cartilage transplantation.

Case 2.—Deformity resulting from intranasal lupus, before and after cartilage transplantation.

Case 3.—Congenital syphilis, bridge repaired by cartilage graft. Note general shrinkage of nose in syphilis

has been previously shaped to suit the deformity, is inserted. To obtain the graft, the seventh or eighth costal cartilage is exposed by a vertical incision through the right rectus at the thoracic margin, one inch of cartilage being removed without perichondrium. In shaping the graft, an outline model of

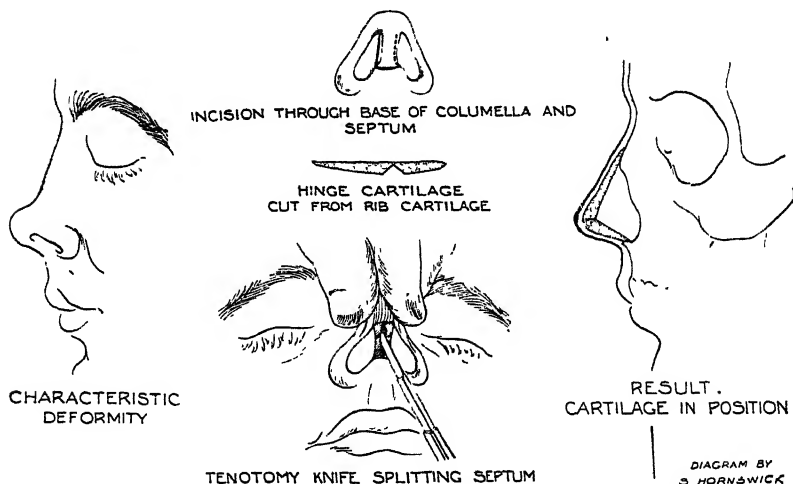


Fig. 73.—The hinged cartilage operation for nasal support. The perichondrium is left continuous across the hinge. (By kind permission of the Royal Society of Medicine.)

the depression in wire is a great help. The results he has obtained in injury and lupus are uniformly good; but in the case of syphilis, the general depression of the nose, owing to loss of mucosa and cicatricial contraction, renders the results imperfect. (*Plate XXXVII.*)

Carter² points out that an abscess of the nasal septum, and occasionally the operation of submucous resection of the septum, may be responsible for a similar deformity. He finds that thin grafts more readily maintain their vitality, and inserts them through an incision in the vestibule. Sheehan³ advises a photograph and cast before the operation. He employs a portion of rib cartilage, preserving any surplus under the skin of the chest for future use if required. Bone is less easy to shape, more easily infected, and more liable to absorption. He employs a similar technique to that of Gillies, described below. He points out that in syphilitic cases it is essential to provide for a new lining to the nose by means of skin grafts, as well as a new framework. This intranasal skin graft is placed in position through an incision above the incisor teeth. Humps on the nose can be removed with a suitable chisel through a similar incision to that employed for grafting. Gillies⁴ employs a method of cartilage grafting which can be readily understood from Fig. 78. In some traumatic cases with lateral displacement in which the injury is not sufficiently recent to permit of replacement, he advises mobilizing the nasal bones with mallet and chisel through a vestibular incision and then resetting them. Blackwell,⁵ as an alternative to this, advises refracturing by blows from a mallet on to a block of wood placed against the side of the nose.

DENTAL CYSTS FROM A RHINOLOGICAL STANDPOINT.

Although dental in origin, these cases most frequently produce signs and symptoms which make them rhinological. Brown Kelly⁶ has dealt with them in detail from this standpoint. The dental or periodontal cyst with which he deals is a relatively frequent condition, and should be distinguished from the relatively rare dentigerous cyst. A dental cyst arises in connection with the root of a diseased tooth, and in the earliest stage can frequently be seen as a small granuloma attached to the apex of such a diseased tooth when it is removed (Fig. 74). It is due to a proliferation of the periodontium and of rudimentary epithelium beneath it, brought about by the spread of septic infection from the pulp through the apical foramen of the tooth. In the early stage the fluid is practically pus and the condition really an abscess. The cyst, once formed, can continue enlarging after removal of the tooth. When of any size, it has a fibrous wall and epithelial lining, and contains a straw-coloured fluid. Probably owing to the relatively softer bone, these cysts are almost invariably met with in the upper jaw.

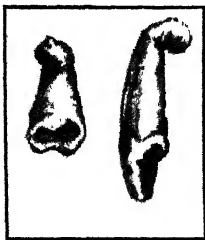


Fig. 74.—Dental cyst seen as small granuloma attached to apex of diseased tooth. (Figs 74-77, by kind permission of the *Journal of Laryngology and Otology*.)

The signs and symptoms produced vary with the tooth and the direction of expansion. From a rhinological standpoint, these cysts must be considered either in relation to the antrum or the nasal passages.

Dental Cysts in the Antrum.—These can be divided into two groups: (1) Dento-antral cysts with distention; (2) Latent dento-antral cysts without distention.

1. Dento-antral Cysts with Distention.—These were formerly regarded as cases of distention of the antrum owing to obstruction of its outlet or to cystic degeneration of its lining. Many supposedly anomalous cases of antral suppuration are of this nature. Suggestive points in the history are a purulent nasal discharge lasting a week or two and recurring at long intervals, a moderate

degree of opacity on transillumination, and a washing from a nasal exploratory puncture which, in the same patient, is sometimes positive, sometimes negative, and sometimes impossible (*Fig. 75*). Pus issuing from a hole in the naso-antral wall below the inferior turbinal is indicative of a cyst having perforated in this situation.

2. Latent Dento-antral Cysts without Distention.—

When a dental cyst invades the antrum without external bulging, no signs are produced as long as it is closed. If, owing to infection, it rapidly distends and bursts, there is a sudden pale-yellow or purulent discharge from the nose. When the inflammation subsides, the sac may close, with, later, the recurrence of the same event. These events are characterized by a sudden flow from the nostril at intervals on stooping. Acute catarrh with closure of the ostium, and acute empyema of the antrum, may give rise to similar symptoms. These latter conditions, however, are distinguished by the presence of pain in the cheek.

An additional diagnostic point suggesting a cyst is the presence of a dark area above the alveolus on transillumination. X-ray examination may also help. The results of exploratory puncture vary as to whether the trocar enters the cyst or the antral cavity. In the former event, usually no return is obtained, unless the cyst has ruptured, but a sample of the contents may sometimes be obtained by suction.

Dento-nasal Cysts.—Dental cysts may grow upwards and produce bulging of the lateral wall or floor of the nose. In the latter case, they produce a fluctuating swelling below the anterior end of the inferior turbinal (Gerber's sign) (*Fig. 76*). Other cysts may also occur in the floor of the nose—namely, retention glandular cysts of the mucous membrane. In either case, when the cyst is of any considerable size, a swelling is produced on the facial aspect. The most important differential point between these two varieties is that the dental cyst arises deep in the bony wall, while the retention cyst arises primarily under the mucous membrane. The cyst wall in the dental variety is squamous-celled, while in the retention cyst it is columnar or transitional. *Fig. 77* illustrates the development on the top row of a glandular

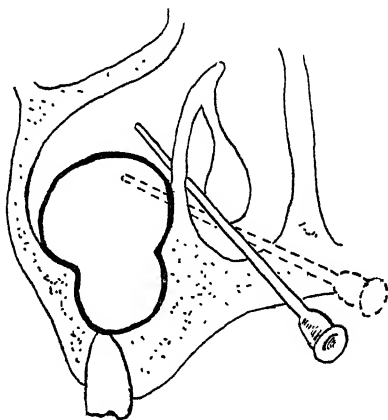


Fig. 75.—Dento-antral cyst with distention.

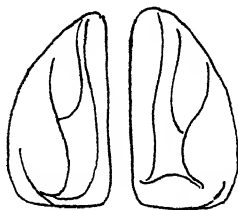


Fig. 76.—Dento-nasal cyst producing fluctuating swelling below anterior end of inferior turbinal.

cyst, and on the lower row of a dental cyst.

TREATMENT.—Puncture and injections are useless. If small, the cyst lining should be removed, with subsequent packing; in the case of larger ones, a large portion of the wall is removed through the mouth, and a flap of mucoperiosteum turned in. After shrinkage has occurred, the cyst remains as a small recess from the mouth. As an alternative, a free opening can be made into the nose, with or without the removal of the partition dividing it from the antrum, and the wound in the mouth sutured, leaving a permanent drainage opening into the nose.

NASAL OBSTRUCTION IN INFANTS.

Nasal obstruction is not infrequently met with in the infant, but is commonly neglected owing to difficulties in examination. Jones⁷ classifies the causes as follows: *Congenital occlusion*, either anterior or posterior; a *temporary engorgement* and excess of secretion during the first few days of life before nose-breathing is established or as the result of simple catarrhal affections; *congenital syphilis*; *mongolism*; and *adenoids*. The diagnosis of congenital occlusion is suggested by the presence of an absolute degree of obstruction, whether unilateral or bilateral. A temporary engorgement and excess of secretion can be recognized and relieved by the application of a dilute solution of Adrenalin in a spray. The diagnosis of congenital syphilis can usually be

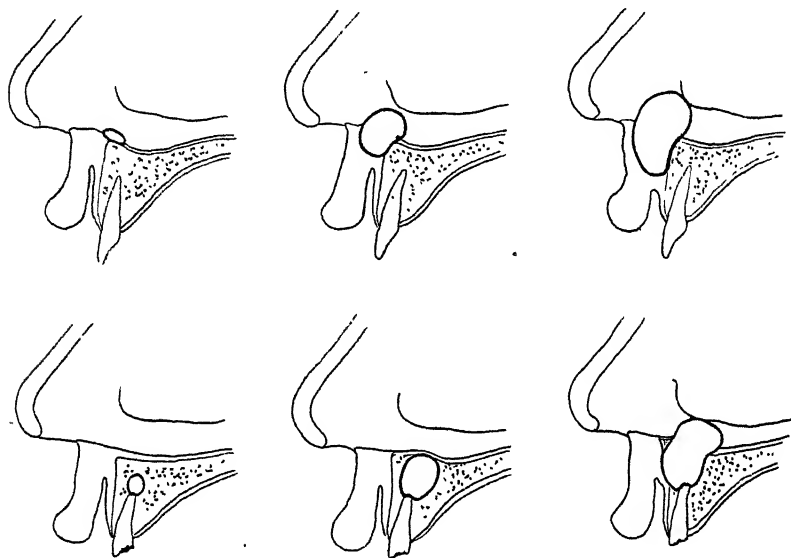


Fig. 77.—Illustrating the development, on the top row of a glandular cyst, and on the bottom row of a dental cyst.

established by the existence of other manifestations. In mongolism, although on casual examination the open mouth may lead to the diagnosis of obstruction, the general appearance is quite typical, and should prevent mistake. The diagnosis of adenoids, which is not at all an infrequent cause of obstruction in infants, even in the first few weeks of life, is practically established by the exclusion of these other and more rare conditions. The minute size of the nasopharynx in the infant prevents either visual or digital examination. The diagnosis can be confirmed and the condition treated at the same time by the use of a small-sized adenoid curette. For this purpose, no anæsthetic is necessary, and in the absence of adenoids less harm is done by the curette than would be done by an attempt at examination by the finger. The results of the removal of adenoids in infants are very good.

REFERENCES.—¹*Jour. Laryngol. and Otol.* 1923, June, 300; ²*Laryngoscope*, 1923, March, 196; ³*Ibid.* 1922, Sept., 709; ⁴*Jour. of Laryngol. and Otol.* 1923, Feb., 85; ⁵*Laryngoscope*, 1923, Jan., 23; ⁶*Jour. Laryngol. and Otol.* 1922, Sept., 433; ⁷*Lancet*, 1922, ii, 327.

NYSTAGMUS, MINER'S. (*Sec EYE AFFECTIONS, GENERAL.*)**ŒSOPHAGUS, DISEASES OF.**

.1. J. M. Wright, M.B., F.R.C.S.

Carcinoma.—Some attention was given to the question of the operative removal of malignant disease of the œsophagus in the *MEDICAL ANNUAL*, 1923, p. 328, and much experimental work is being done in the devising of operations for this purpose. The question of the liability to the occurrence of secondary growths is of importance in this connection, owing to the necessary severity and high mortality of radical operations.

Metastases in Œsophageal Carcinoma.—Helsley¹ has examined published views on this point, and has himself investigated 70 fatal cases. He points out that while Forster and Billroth state that metastases are not found early, Ewing gives the alternative view. He divides the 70 cases examined into three groups. The first group, in which no metastases were present, included 45 cases, or 64 per cent; the second group, in which metastases were limited to the lymphoid glands in the neighbourhood or in the œsophagus itself, included 4, or 6 per cent; the remaining group showed diffuse metastases. The locality of the tumour did not seem to have any marked effect on the tendency to dissemination. He concludes that in the majority of cases, during the early stages of the complaint, carcinoma of the œsophagus is a local disease.

Fibrous Strictures.—These are most frequently the result of the swallowing of a corrosive fluid, and although relatively uncommon in this country, they are apparently not at all infrequent in the United States and on the Continent of Europe. Clerf,² in an article on strictures as a result of the swallowing of commercial lye, points out that 20 cases of œsophageal stricture from this cause were admitted to hospital in Philadelphia during sixteen months, showing that, in the United States at any rate, this matter is of considerable importance. Many commercial preparations of lye are employed for household use for cleaning and the making of soap. He points out that the swallowing is practically always accidental. The lye, in powder or solution, is left within reach of the child, or sometimes the accident is due to the residue adhering to a cup which has been used to measure the liquid. The chief reason for the number of these accidents is that the poisonous nature of these preparations is not recognized. Lye may be purchased anywhere, and the labels contain either no warning or only an inconspicuous one. The matter is regarded as of sufficient importance to justify attempts at legislation.

REFERENCES.—¹*Ann. of Surg.* 1923, March, 271; ²*Jour. Amer. Med. Assoc.* 1923, June 2, 1600.

OPTIC NERVE, AFFECTIONS OF.

A. Bernard Cridland, F.R.C.S.E.

Etiology of Optic Nerve Atrophy.—C. O. Hawthorne,¹ in opening a discussion on the etiology of optic nerve atrophy, considers the subject under the headings of trauma, poisons, syphilis, intracranial tumours, meningitis, cardiovascular diseases, and retrolbulbar neuritis.

Under trauma, beside the usual forms of direct injury which give rise to atrophy, reference is made to cases of direct head injury where no fracture of the skull has occurred but vision has failed, owing to atrophy, some weeks after the injury, and the author asks if these are not examples of hæmorrhage into the sheath of the optic nerve.

Under poisons, the suggestion is made that cases of bilateral central scotoma should not certainly be put down to tobacco unless such a conclusion is supported by the negative results of a complete examination of the nervous system whereby disseminated sclerosis or tabes dorsalis can be excluded.

Syphilis admittedly exercises a wide range of influence in the production of optic nerve atrophy, but in the hereditary form the most interesting perhaps are cases of juvenile tabes dorsalis.

Hawthorne has observed optic atrophy as part of a tabes at 17, 24, and 28 years respectively, and a point for discussion was the maximum age limit at which this can occur. Considering that interstitial keratitis may be postponed to the twenties or thirties, it would not be improbable that optic atrophy and tabes dorsalis might share in this delay. In the acquired form the author mentions a case of optic neuritis as early as four months after infection. With regard to tabes dorsalis, it is said that optic atrophy never precedes loss of knee-jerks or lightning pains in the lower limbs; this, Hawthorne considers, is incorrect, and he further submits that optic atrophy, the Argyll Robertson pupil, and an ocular paralysis are three events any one of which may be the first announcement of para-syphilitic degeneration in the nervous system; that each may be associated sooner or later with evidences of parallel changes in the spinal cord; and that each may persist for a prolonged period, and perhaps indefinitely, without the development of spinal symptoms.

Under intracranial tumours, the question is raised as to whether such tumours, other than pituitary growths, can ever cause primary optic atrophy. Two cases are quoted which point to this possibility.

In cardiovascular diseases, the pathogeny of embolism of the retinal artery is discussed, and the author's view is that these cases are examples of true embolism arising from intracardiac thrombosis.

Retrobulbar neuritis in disseminated sclerosis is discussed, especially with regard to the length of time which may elapse between the attack of neuritis and the occurrence of signs of disseminated sclerosis. The interval may be as long as 8, 10, or even 12 years, and the author has experience of one case now under his observation for thirteen years in which, although one eye is almost blind from optic atrophy, the patient remains in good health. Occasionally retrobulbar neuritis may occur at a period of life when the occurrence of disseminated sclerosis is no longer probable (at 50 years and 43 years in the author's experience). He has also seen an ocular paralysis occur with the nerve inflammation. Grouping together various forms of retrobulbar neuritis, the author distinguishes (1) the neuritis associated with an acute inflammatory process affecting widely the nervous system (myelitis) and probably of toxic agency, (2) that occurring in disseminated sclerosis, which must own a not dissimilar influence, (3) a neuritis alone or combined with obvious exudation of the optic discs, and (4) where exudation at the discs is present, as in chlorosis, without any suggestion of a retrobulbar lesion; and he asks, if in the first two groups it is undoubted that inflammatory changes (thrombosis with cellular and fluid exudations) due to a toxic agent exist, is it not probable that similar causes are responsible for the instances in which the mischief is confined to the visual tract?

J. Hogarth Pringle² discussed the question of optic atrophy from diffused violence to the skull, and expressed the view that the impairment of vision was due to hæmorrhage into, and consequent increased tension in, the sheath of the optic nerve. Out of 395 fractures of the skull under his care, post-mortem examination was carried out in 174 out of 209 fatal cases. Only 13 of these showed a fracture involving the optic foramen; the anterior clinoid process was found displaced in 6, but without hæmorrhage into the nerve-sheath; whilst in 16 cases hæmorrhage into the nerve-sheath was present without fracture. None of these patients were conscious during observation, so that visual results could not be determined. The hæmorrhage may be derived (1) from the subdural cranial space, (2) from rupture of vessels passing

between the nerve and its covering, (3) from the central vessels of the retina before entering the nerve substance. The hæmorrhage begins at the distal extremity of the nerve close to its entrance to the eye. The author operated in three cases, and in each found blood under tension in the optic nerve-sheath.

H. M. Traquair³ dealt with the subject from the ophthalmic point of view in a contribution so complete that any attempt to abstract it would be unjust to its author, and those interested are advised to study the original.

R. T. Williamson⁴ emphasizes the importance of examining the field of vision for hemianopsia in cerebral cases. It is especially of value in diagnosis when cerebral symptoms have occurred suddenly and recovery has apparently followed and yet no evidence of localized organic lesion can at first be detected. The finding of hemianopsia in cases such as this, where the previous cerebral symptoms have been ill defined, is a clear indication that an organic focal brain lesion has occurred. In the acute cases the cause is usually softening in the region of distribution of the posterior cerebral artery from thrombosis or embolism of that vessel; in other cases it is due to hæmorrhage involving the fibres between the region of the basal ganglia and the occipital cortex. In the more chronic cases hemianopsia may be the result of tumour, abscess, basal meningitis, or other lesion. The usual simple methods of testing for hemianopsia, when a perimeter is not available, are described.

W. J. Wellwood Ferguson⁵ suggests that in cases of young adults suffering from diplopia, optic nerve atrophy, or retrobulbar neuritis, an *investigation of the cerebrospinal fluid* by (1) the Wassermann test, (2) the test for protein content by the Ross-Jones method, and (3) Lange's gold colloidal test should prove of undoubted value. The last-named reaction would indicate the first definite sign of organic disease of the central nervous system, and in cases of transient diplopia or retrobulbar neuritis would give some clue as to the outlook.

Relationship of the Optic Nerve to the Nasal Sinuses.—A. C. Woods and J. R. Dunn⁶ have investigated 86 cases which presented various optic nerve changes, with a view to determining the possible relationship of any of the changes to disease of the accessory nasal sinuses. It was found that 12·7 per cent were caused by sinus disease, and the remainder as follows: syphilis, 40 per cent, tumours of the cerebrum or optic nerve 11·6 per cent, multiple sclerosis 5·8 per cent, toxic amblyopia 11·6 per cent, widely separated conditions (mongolian idiocy, etc.) 3·5 per cent., and 14 per cent no definite diagnosis. Of the cases (11 in all) due to sinus disease, 10 were due to ethmoidal disease and 1 to sphenoidal. All presented the signs of a retrobulbar neuritis, 4 being acute and 7 in the atrophic stage. The picture which was observed in all was that of a retrobulbar disturbance: diminished vision, the defect being in the central field and manifested by a central scotoma of varying intensity, normal field outlines, and normal media and fundus. In no case did the authors observe ophthalmoscopically signs of inflammation or disturbance at the optic disc; and whilst they are not prepared to say that such findings may not occur, they believe that it would be the exception rather than the rule to find disc changes in the disorders of the optic nerve caused by sinus disease.

Gavin Young⁷ has dissected the sphenoidal sinuses in some thirty subjects in the post-mortem room with a view to demonstrating the varying relationship of the optic nerve to the sphenoidal sinus and posterior ethmoidal cells. He finds that the relationship varies with the amount of sclerosis of bone present; thus, before the bone forming the cell walls becomes absorbed—i.e., in the sclerotic type—the optic nerve is related not to the sphenoidal sinus but to the posterior ethmoidal cell; but as absorption takes place, the relation changes

until in the thin-walled sinuses the canal of the nerve is in relationship to the sphenoidal sinus posteriorly to the ethmoidal cell. An interesting point in the investigation is that in more than half the subjects pus was found in one or both sphenoidal sinuses.

REFERENCES.—¹*Brit. Med. Jour.* 1922, ii, 1157; ²*Ibid.*; ³*Ibid.*; ⁴*Practitioner*, 1923, April, 276; ⁵*Brit. Med. Jour.* 1922, ii, 1260; ⁶*Jour. Amer. Med. Assoc.* 1923, April 21, 1113; ⁷*Brit. Med. Jour.* 1922, ii, 1258.

ORAL SEPSIS, AND ITS CAUSAL RELATIONSHIP TO ARTHRITIS, NEURITIS, FIBROSITIS, ANÆMIA, AND OTHER SYSTEMIC MALADIES. (*See also* TONSILS, DISEASES OF.) *Herbert French, M.D., F.R.C.P.*

INTRODUCTION.

That oral sepsis, particularly dental sepsis, is responsible for much systemic disease and disorder is beyond doubt; and a debt of gratitude is due to pioneers such as Rigg and William Hunter, who were among the first to insist that tooth infections were often in great part responsible for serious systemic maladies, even to the extent, perhaps, of producing fatal pernicious anæmia. As so often happens, however, there has been an unduly strong swing of the pendulum, so that whereas at first the idea that dental sepsis could be responsible for disease at all was met with considerable scepticism, nowadays it is accepted with far too little caution. Hosts of patients have their illnesses attributed to infected teeth with an alacrity which is almost appalling, and upon evidence which is often almost nil. The laity is beginning to rebel against this, and very rightly; and it behoves us to be able to discriminate with more attempt at accuracy than is universal between cases in which tooth extraction is essential in the treatment of systemic disease, and cases in which such extractions are not called for. Millions of teeth are extracted that should be left alone; millions are left unextracted which should be taken out if the patient is to get well; the difficulty is to decide, as accurately as possible, without bias and without flimsiness of judgement, which are which.

An Instance to Illustrate the Difficulty of Ascertaining the Exact Focus responsible for Systemic Disease.—It is agreed that many cases of fibrositis, neuritis, lumbago, sciatica, rheumatoid arthritis are the result of absorption into the system of microbes and microbial toxins produced elsewhere than near the parts that are painful and inflamed; it is equally agreed that dental sepsis is responsible for many of these cases, especially perhaps rheumatoid arthritis; but supposing a young married woman comes under observation crippled with subacute infective peri-arthritis of her wrists, fingers, shoulders, and knees, presenting at the same time sore gums, with pus oozing from her tooth sockets and a dirty state of her teeth in general, is it right to assume forthwith, as often is the case, that the dental sepsis is the source of her joint troubles? Who can say offhand that she may not have gonococci in her uterine cervix? Even when there is obvious dental sepsis, a full general bacteriological purview of the case is needed before the tooth infection can be accused of being causal of the systemic disease. The oral sepsis will naturally receive attention even in a gonorrhœal case, but extensive tooth-extractions may perhaps be avoided in such a case as the above, the joint troubles being cured by local treatment of the gonorrhœal focus in association with a course, may be, of gonococcal vaccine, instead of by tooth removal and a vaccine prepared from oral streptococci.

NEED OF A COMPLETE BACTERIOLOGICAL PURVIEW.

Before it is assumed in any case whatever that dental sepsis is responsible for the patient's illness, it is most important to have a complete bacteriological

investigation to make sure that no other focus than the mouth contains the germs producing his or her disease. To be complete one needs to know the results of cultures taken carefully from: (a) The nostrils; (b) The gums and tooth sockets; (c) The tonsils; (d) The pharynx; (e) The posterior nares; (f) The sputum, if any; (g) The ears, if there is discharge, past or present; (h) The urine, collected aseptically; (i) The stools (more specimens than one); (j) The vagina and cervix uteri (in a woman); (k) Sometimes the urethra, perhaps after prostatic massage, in a man, if there is past gonorrhœa; (l) Sometimes the accessory nasal sinuses—antral, frontal, ethmoid, and sphenoid. Sometimes one needs to know whether the Wassermann reaction is positive or not. It is also advisable to have a complete blood-count, or at any rate a total and a differential leucocyte count, in case a leucocytosis and a relative increase in the polymorphonuclear cells give the clue to deep-seated foci of unsuspected suppuration, such as may be present in a pyosalpinx, an infected gall-bladder, or the vermiform appendix. Eosinophilia may be discovered, leading to the recognition of unsuspected worms as the primary cause of anæmia and general ill health.

It is granted that so extensive a series of examinations is frequently out of the question on account of the circumstances of the case: some of them may be omitted as being unnecessary on clinical grounds, but in difficult cases of rheumatoid arthritis in particular it is important to know all one can about the patient's bacteriology before jumping to the conclusion that the main factor in causation is oral sepsis.

One would go further, and point out that sometimes even the above formidable list requires additions. May not residual typhoidal, or dysenteric, or Malta fever, or even other infections, need exclusion by Widal and analogous blood-serum agglutinin tests before one can be sure that oral sepsis is the main thing calling for attention?

Difficulties in Interpretation even when Full Data are to Hand.—Even when full bacteriological data have been collected, it may be extremely difficult to interpret them correctly. There are few absolute criteria, and the personal equation enters all too largely into the conclusions drawn. This is particularly the case, perhaps, in connection with the streptococcal group, especially streptococci from the mouth or from the stools. If urethral or vaginal gonococci are found in the course of a routine examination, or Friedländer's bacilli in the sputa, or Shiga's bacilli in the stools, there will be considerable probability that these essentially abnormal flora are causal of disease; though even so the probability is not a certainty. Suppose, however, that the patient has abundant *Staphylococcus aureus* in a post-nasal discharge, but equal abundance of *Streptococcus viridans* in his tooth sockets and of *Str. longus hæmolyticus* in his stools, how is one to determine whether his fibrositic or other systemic malady results more from the post-nasal catarrh, or from the dental infection, or from the infection of the colon? Naturally all three foci would be treated, and perhaps a mixed vaccine employed; but should one go so far as extensive tooth extraction? Of recent years there has been too little tendency, in some quarters at least, to pause and think before advice has been given; teeth have been taken out wholesale, with no benefit to the patient, because of too much haste and too little discrimination; dental radiograms may not have been taken, or there may have been no general bacteriological examination at all, the discovery of *Streptococcus viridans* or *hæmolyticus* in the tooth sockets having been regarded as sufficient.

It is these streptococci in particular that are the most difficult to give a judgement on, wherever they occur; notably when they are cultured from the teeth, the tonsils, or the stools. It is not every bacteriologist who can

give a really sound opinion as to whether what he finds on culture is normal, accidental, or pathological. One may be misled by the reports unless they are based on special skill and care; time may be required for subcultures and special tests, and yet the laboratory is apt to be rebuked if there is delay in returning the report. Trouble arises from the fact that the mouth and saliva normally contain the *Streptococcus salivarius*, which has to be differentiated from the *Str. viridans*, the *Str. pyogenes brevis*, the *Str. longus haemolyticus*, and perhaps others; similarly the stools normally contain *Str. faecalis* or enterococcus, which is, it seems, not a disease producer, though it may be associated with *Str. brevis* or *Str. haemolyticus*, which are. One has to rely much on the care bestowed upon his work by the bacteriologist; and to help him it is important that the specimens should reach him as soon as possible after they have been taken from the patient. Unfortunately there is a big source of

Fallacy due to Sending Specimens by Post.—When a specimen of faeces or sputum in which there are mixed flora lies all night in a pillar-box or elsewhere in transit in the summer time, the 'weeds' overgrow the 'plants'; in the winter, on the other hand, the specimen may be actually frozen and the 'plants', alive on starting, are dead before they reach the laboratory, or at least too chilled to grow. The result is an erroneous culture, and a fallacy that could be avoided if the specimens were incubated with no such postal delay. If the patient cannot be seen by the bacteriologist in person, the specimens require rapid transit to the laboratory by messenger rather than by post—a strong argument in favour of laboratories in many provincial towns rather than reliance upon central ones in cities.

The Value of Urine Cultures and Agglutination Tests.—Although it is very difficult to find strong and reliable evidence upon which to incriminate streptococci found in mouth or stools, there are two lines of collateral evidence, too little used, that may assist the investigator in coming to a judgement, namely: (1) Urine cultures; and (2) Serum agglutinin tests.

1. *Urine Cultures.*—Whenever there are definite symptoms of urinary infection of some kind—coli bacilluria, for instance—cultural examination of a catheter specimen of urine is resorted to readily enough; but it is recognized insufficiently, perhaps, that quite apart from any local infection of kidney, ureter, or bladder, the kidneys can excrete micro-organisms from the bloodstream without suffering themselves, and it is sometimes possible to recover the organisms thus excreted, by cultivation of the healthy urine, thereby obtaining a direct clue as to the germ that is inflicting systemic damage on the patient. It does not follow, of course, that the organism recovered from the urine is the disease producer; but if one is wondering, for instance, whether streptococci from the teeth, or *Staphylococcus aureus* from the posterior nares, is the more directly pathogenic germ in a particular case, and urine cultures yield *Staphylococcus aureus* in fair numbers, but no streptococci, there is this much additional ground for incriminating the staphylococci and the posterior nares rather than the streptococci and the teeth, and vice versa. The difficulty is to get the germs to grow even when they are present in the urine. Urea is a strong protoplasm destroyer, so that specimens sent by post will generally be reported sterile. The cultures need to be made from the centrifugalized urine with a minimum of delay. Moreover, the number of organisms present may be very few, and it may take several days before colonies become visible upon the culture media in the incubator. In the case of streptococci, for example, a report based upon the appearances seen on the first, second, or even third day may be negative, and yet colonies may become visible on the third or fourth day and prove to be due to definitely pathological micro-organisms and not to contamination or accident. Their discovery in the urine,

other things being equal, helps to confirm the view that streptococci of precisely the same type found elsewhere in the patient are causally connected with the systemic symptoms; a direct guide being thus afforded to the kind of treatment most likely to do the patient good. A negative urine-culture counts neither way.

2. *Agglutination Test.*—When some organism has been found—a streptococcus, for example—it is sometimes helpful to test it against the patient's own serum to find out whether the latter shows any degree of special tendency to agglutinate it; if so, the fact affords slight but definite presumptive evidence that the germ in question is a *causa causans* in the case.

TEETH NOT THE ONLY FOCI OF INFECTION IN ORAL SEPSIS: OTHERS,
ESPECIALLY THE TONSILS, ARE IMPORTANT.

Having said enough, perhaps, to indicate some of the many difficulties one meets with in deciding what organism is responsible for the patient's systemic malady, let us now assume that, after careful examination and deliberation, one has come to the conclusion that the primary focus of the trouble is in the mouth—'oral sepsis' in a general sense. It still may not follow that the teeth are the main culprits; oral sepsis and dental sepsis are by no means synonymous or interchangeable terms. The nasal mucosa, middle ears, posterior nares, antral, frontal, sphenoidal, ethmoidal air cells, and chronic infections within them, have presumably been excluded, but there remain, besides the teeth: (1) The tonsils; (2) The pharynx; (3) The tongue.

1. *The Tonsils.*—The tonsils are particularly important; many a patient has had all the teeth removed for the cure of conditions attributed to oral sepsis when the teeth should have been cleaned but left in, and the tonsils enucleated. Sometimes the septic state of offending tonsils is obvious at sight; but quite often they may appear fairly normal to a casual inspection, and yet be the site of persistent suppuration, especially in their lower poles. Neither need be enlarged, and yet, if a careful examination is made in such a way as to bring into view the lowest part of each in turn whilst a finger is pressed gently but firmly in upon the neck outside the tonsil, a worm of pus may be observed exuding from the latter; such a tonsil, innocent enough at first sight, may be a source of troubles quite as bad as any that arise from teeth; it should be cured even if cure entails complete enucleation. The lingual tonsil may be an offender in a similar way.

2. *The Pharynx.*—Pharyngeal infections seldom occur alone, but are more often associated either with post-nasal catarrh or with chronic sepsis in one or both tonsils; but they are important in that they may persist even when the tonsils have been enucleated or when post-nasal catarrh has been relieved; the pharynx itself may call for local treatment.

3. *The Tongue.*—Streptococcal glossitis, with or without similar infection of the cheeks, palate, or buccal mucosa generally, merits an article to itself (*see GLOSSITIS, STREPTOCOCCAL*).

DENTAL SEPSIS: PYORRHOEA.

When, by a process of exclusion rather than by a hasty jump at a conclusion, it seems likely that dental sepsis is the *fons et origo mali*, it is still far from a simple matter to decide, sometimes, what should be done about the teeth. It is easy enough to order them all out; but is the order right in each case in which it is given? There is no doubt that it is often wrong. Nevertheless, to let the patient retain teeth that are causing him fibrositis, rheumatoid arthritis, anæmia, or what not, is just as wrong as to advise him to have his

teeth removed when they are perfectly healthy. The whole difficulty is to determine what sorts of dental sepsis are bad for the system generally, and what sorts matter from a purely dental point of view only.

Unfortunately there is no decisive opinion on these points. Some consider that any form of dental sepsis must be eradicated drastically; others, that pyorrhœa alveolaris by itself matters little beyond being a locally unpleasant state of affairs, much more stress being laid upon apical infections than upon pus-oozing gums. Every doctor and every dentist must make up his mind for himself; but it is at any rate of value to analyse the different conditions that, mingled together in varying proportions, together constitute what is termed 'dental sepsis'.

Tartar is Not Necessarily Sepsis.—In the first place, the teeth may look as if they were intensely septic when all that is the matter is the accumulation of tartar, sometimes in great masses round the individual teeth, or on their inner aspects and between them; with food particles adhering to the tartar. The mouth looks dirty, the gums may be inflamed, and bleed readily on touching; and yet the whole of the trouble may be on the surface, the teeth themselves being sound and healthy both inside and outside the sockets. Scaling and general cleaning by a dental surgeon removes all the trouble, and if it is dealt with soon enough the condition can be put completely right. If left alone,

DESCRIPTION OF PLATE XXXVII.

- Fig. A.*—Normal alveolar margin, age 25. Front teeth.
Fig. B.—Absorption of alveolar margin. Front teeth.
Fig. C.—Normal alveolar margin, age 25. Back teeth.
Fig. D.—Absorption of alveolar margin. Back teeth.
Fig. E.—Normal periodontium. Arrow points to normal periodontal line.
Fig. F.—Periodontal absorption. Arrow points to thickening of the periodontal membrane.
Fig. G.—Normal alveolus round tooth.
Fig. H.—Rarefaction of alveolus round tooth, indicated by arrow.
(Figs. A and B are from the upper jaw, and are therefore inverted.)

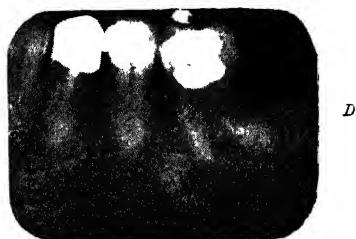
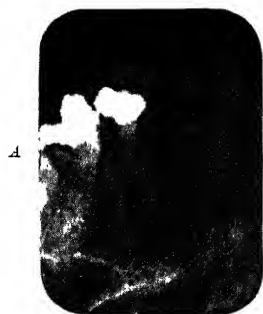
infection spreads from the surface down into the sockets, and then real dental sepsis supervenes. On the other hand, dental sepsis may be quite pronounced in individuals who clean their teeth carefully and have no tartar or other superficial uncleanness at all.

Caries is Not Necessarily Dental Sepsis in the Medical Sense.—In the next place, mere cavity-formation in teeth from dental caries is not dental sepsis in the medical sense; it is often associated with dental sepsis, but it may occur without it. Caries calls for dental treatment, naturally; but merely to see half a dozen carious cavities in the mouth of a patient who has some microbic-toxic illness such as rheumatoid arthritis is by itself insufficient evidence upon which to base an opinion that the teeth are causal. Yet how often one has seen such a case in which, when the teeth have been thus carious, the hasty advice given forthwith has been: "Your teeth are really dreadful; they are the cause of your arthritis, and you must have them all out at once."

Alveolar Absorption; Periodontitis; Apical Infection: Infection round a Buried Root or Unerupted Tooth: X Rays Essential in Diagnosis.—There are, however, very definite socket-lesions connected with teeth, from which so much absorption, either of microbes themselves or of microbic-toxins, takes place, that infective lesions are produced elsewhere in the body. Such tooth-socket infection may exist even when the visible parts of the teeth seem perfectly sound and healthy, and it may be quite impossible for a dental

PLATE XXXVII.

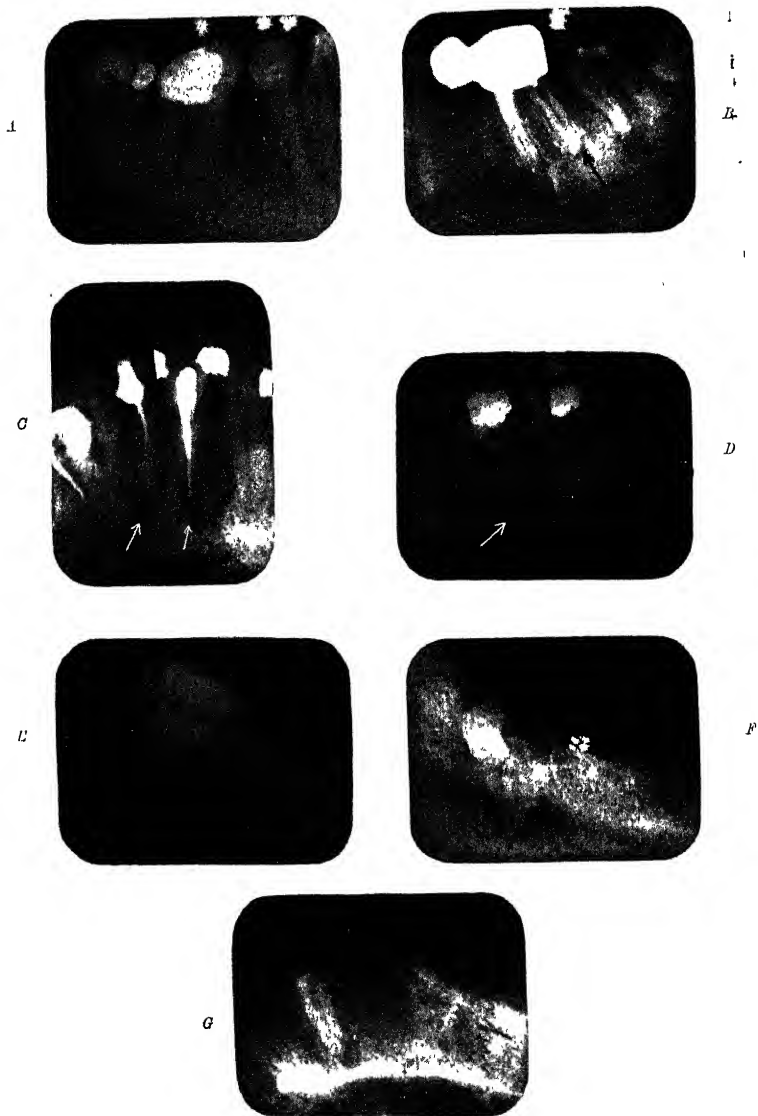
DENTAL SEPSIS



From original skiagrams kindly supplied by
Mr. F. C. Willous, L.D.S.

PLATE XXXVIII.

DENTAL SEPSIS—continued



*From original skiagrams kindly supplied by
Mr. F. C. Willows, L.D.S.*

surgeon to decide by inspection only that no such foci of infection exist. It is essential that the teeth should be radiographed, and that the radiograms should be interpreted by someone who has more than a little experience of the significance of the various appearances that they may present. Broadly speaking there are four main types of abnormality to be distinguished, namely: (1) Alveolar absorption; (2) Periodontal rarefaction or absorption; (3) Apical infection; (4) Infection round a buried root or an unerupted tooth.

The first three of these are generally associated with one another in varying degrees; the least important is *alveolar absorption*—that is to say, diminution in the amount of bone along the free margin of the jaw so that the depth of the tooth sockets is correspondingly lessened (*Plate XXXVII, A, B, C, D*). Carried to an extreme degree, no tooth socket may remain and the teeth fall out without any essentially pathological process having been at work; it may be due to simple atrophy from age; more often, however, it is accentuated by long-continued rarefying osteitis of the jaw margin, associated with definite *periodontitis*, the latter leading to one or other of three main radiographic departures from the normal, namely:—

a. A narrow line, black in the negative, between the tooth and the bony wall of its socket as the result of disappearance of the alveolar bone immediately

DESCRIPTION OF PLATE XXXVIII.

Fig. A.—Undue density of bone, indicated by arrow.

Fig. B.—Apical infection of crowned tooth (normal apices are shown in *Plate XXXVII, C*). Arrows point to the three stages of peri-apical disease: (a) Thickening of periodontal membrane; (b) Blurred aspect associated with the formation of pus; (c) Clearly defined areas of absorption (granuloma).

Fig. C.—Apical infection of uncrowned front teeth (normal apices shown in *Plate XXXVII, A*).

Fig. D.—Apical infection of uncrowned back teeth (normal apices shown in *Plate XXXVII, C*).

Fig. E.—Normal unerupted tooth.

Fig. F.—Infected unerupted tooth.

Fig. G.—Infected buried stump.

(*Figs. C and G* are from the upper jaw, and are therefore inverted.)

adjacent to the tooth (*Plate XXXVII, E, F*). This is the condition that is in the main responsible for *pyorrhœa alveolaris*. Inflammation around the tooth leads to pus-formation in the linear space around it, and on pressing the gum at the side of the tooth a bead of pus is squeezed up to become visible between the gum and the neck of the tooth. When sufficient periodontal absorption has taken place, the tooth, having no bony support, is no longer rigid, but can be felt to 'play' when it is held firmly and pushed forwards and backwards; presently it may become so loose that it is kept in the jaw only by the soft parts entering its apex; and if left to itself it ultimately falls out spontaneously.

b. Undue lightness (darkness in the negative) (*Plate XXXVII, G, H*) of the bone-shadow of the jaw for a variable distance round the affected tooth; this is the result of rarefying osteitis, not as a rule pustular, though it may in rare instances end in necrosis of the jaw bone itself.

c. Undue density (lightness in the negative) of bone-shadow round tooth socket, sometimes with less than the normal clarity of definition between the outline of the tooth and the margins of its socket (*Plate XXXVIII, A*); this is the result, not so much of periodontitis itself, as of nature's repair of previous periodontitis; it is evidence of spontaneous cure of past rather than of present trouble; though both repair and active periodontitis may co-exist.

When one asks what significance any or all of these changes have in relation to the need for tooth extraction, one finds that there are very wide differences of opinion; one reason for this is that the purely dental needs of the case by no means necessarily coincide with the medical needs. The dental surgeon may be keen to do away with all trace of pyorrhœa, and his experience may tell him that the quickest way to do this is to extract all the teeth round which there is definite periodontitis and bone absorption. The physician is apt to bow to the dental surgeon, and concur in advising wholesale extractions, in the belief that this is essential to the cure of his patient's systemic illness—rheumatoid arthritis, for example; but he is often disappointed in not getting the good results he hoped for, and the patient may be furious at having lost all her teeth in vain. Is not this because pyorrhœa alveolaris has only to be complete enough for the patient not to be systemically ill from it at all? An empyema makes a patient very ill until it has been cut into and drained; but once opened, and drained efficiently, pus galore may escape from the empyema cavity and yet the patient may feel almost well. Similarly in regard to periodontitis and pyorrhœa alveolaris: it is when the trouble is in its earlier stages and the pus that is forming is impeded in its escape that absorption of microbes and their toxins into the blood-stream is at its worst—not when every socket is spouting pus and all the teeth that have not fallen out already are loose and wobbly; when this stage is reached the main damage by microbial absorption has been done; the points or what not that are affected have been injured by microbes or their toxins that have been absorbed months or years before.

Pyorrhœa itself, if free enough, is relatively free from medical dangers; it is when the pyorrhœal pus cannot escape freely that the medical dangers mainly arise. Rarefaction of the bone around the tooth, or increased density of that bone as the result of repair, are less important to the physician than is the black line down the tooth-sides; yet when that line is seen, it is still most difficult to say whether tooth extraction should be hastened or whether other means of curing the earlier, and medically most dangerous, stages of periodontitis should be tried first. It is agreed that the condition should be cured; the difficulty is to decide without bias whether the teeth should be removed. Fortunately there is an increasing degree of success on the part of those who try to cure pyorrhœa without extraction. The methods employed are various—assiduous applications of antiseptics on very fine probes down into the tooth sockets; electrolysis and the formation of nascent oxygen locally round the teeth; the use of salvarsan or equivalent solutions locally or by intravenous injection; assisted perhaps by the use of vaccines prepared carefully from cultures made from the patient's own pyorrhœal germs. All these things are worthy of trial for a limited time before extraction is resorted to unless the systemic illness is too urgent to brook delay; even when extractions have to be resorted to because of non-success with other measures, caution should be enjoined before every tooth in the head is taken out—the radiograms afford the guide as to which, if any, may be left.

Apical Infection is shown in (negative) radiograms as a black area at and around the apex of the tooth at the very bottom of its socket (*Plate XXXVIII, B, C, D*). It may be associated with general periodontitis and alveolar absorption; but it may exist almost by itself, and be completely unsuspected unless the X rays are used to detect it. From the medical, as distinct from the dental, point of view, it is regarded as of infinitely greater moment than is periodontitis and pyorrhœa alveolaris. The condition has sometimes been spoken of as apical 'abscess', but as a rule there is no actual pus present at the tooth-apex; more often it is a curious jelly-like material taking the place of the absorbed

bone. Nevertheless it is nearly always infected, and the toxins produced in this small deep-seated focus cannot escape anywhere except into the lymphatics or blood-stream, unless the 'abscess' actually turns to pus and by good fortune burrows its way laterally through the bone of the jaw to point through the soft parts as a 'gumboil'. The main cause of gumboils is an apical 'abscess' of this kind; the gumboil is nature's way of trying to cure the latter. Uncured, an apical 'abscess' is a potent source of systemic danger; and one should hesitate little in advising extraction of any tooth so affected, until the time comes when dental surgery devises some means of curing the apical infection without extraction.

Crowned teeth are, it seems, more liable than others to apical infection of this kind; partly because the dental canal is so devious that it is hardly ever possible to fill it right down to the apex before a tooth is crowned. The result is that the deepest part of the tooth canal retains dead organic matter, the crown bottles this in, and in the course of time it goes bad and yet cannot discharge its contents, which therefore tend to enter the systemic circulation and give rise to all sorts of microbic and microbic-toxic diseases by metastasis.

Infection of an Unerrupted Tooth, or of a Buried Stump (Plate XXXVIII, E, F, G), may escape detection unless a radiogram is taken; so that in one's search for a possible cause of disease it may sometimes be necessary to X-ray jaws that are seemingly quite toothless and healthy. The effects of absorption of microbes or their toxins from such buried foci may be quite severe: in one case the continued pyrexia was diagnosed as typhoid fever until a septic stump was detected, the typhoid fever ceasing the day after the infected prong had been extracted.

CONCLUSION.

Space does not permit of a discussion of the many maladies that may arise from oral sepsis just as they may from any other form of sepsis in an ~~enclosed~~ place. Fibrositis, neuritis, myositis, arthritis, synovitis, lumbago, sciatica, are amongst those thought of first, perhaps; but there are many others—general ill-health; obscure pyrexia; anæmias, simple and grave; purpura; infective endocarditis; periostitis; gastric ulcer; duodenal ulcer; appendicitis; perhaps some of the common chronic maladies of obscure origin, such as arteriosclerosis and granular kidney; and so on. Some have their connection with oral sepsis definitely established; for others the relationship depends on surmise rather than upon proof.

There is no dispute as to the importance of oral sepsis as a cause of systemic disease; but the purpose of this article has been to emphasize the difficulties there often are in proving that oral sepsis is the *causa causans* in individual cases; to urge that other possible sources of infection should be looked for and excluded before the mouth is blamed; to press home the fact that, even when oral sepsis is at fault, there are other oral foci of infection besides the teeth; and that even when the issue has been so narrowed down that one is forced to incriminate the teeth, one needs the help of dental skiagrams, dental consultants, and much careful thinking before one can advise the patient to his own best advantage as to whether, from the purely medical point of view, any of his teeth should come out, and, if so, how many. Wholesale extractions, hastily advised, are to be deprecated. If it is wrong to leave in teeth which should come out, it is almost as wrong to take out teeth which should be left in; the crux is to decide sanely which are which.

ORTHOPÆDIC SURGERY. (See BONES AND JOINTS, SURGERY OF.)

OTITIS MEDIA. (*See EAR.*)

OVARY AND ITS FUNCTIONS.

W. E. Fothergill, M.D.

Conservation of the Ovary.—Kross¹ writes on the degeneration of conserved ovaries after hysterectomy. After studying the records of other workers, the writer conducted extended experiments, using rats for this purpose. In consideration of the numerous clinical evidences of degeneration, especially cystic, and in view of the evidences of degeneration that were almost invariably found in the ovaries of animals studied in his experiments, this writer concludes that conservation of sound ovaries where the uterus is removed is of no avail in preventing distressing menopause symptoms. The dangers of cystic and other degenerative changes are so great that the retention of ovaries involves a grave risk; and it is safer to remove the ovaries in all cases where a hysterectomy is performed.

Transplantation of the Ovary.—F. H. Martin² discusses further progress in the study of ovarian transplantation. He has been writing on this subject since 1903, and this is his sixth report. He says that, as more evidence is accumulated, the claims of the earlier enthusiasts seem to become less and less substantial. Clinically there is very little to encourage one to believe that transplantation of ovaries as practised up to the present time has more than speculative value as a surgical procedure. There is evidence that autotransplants are of some value in deferring the symptoms of the menopause and delaying the cessation of menstruation. It is difficult, however, not to attribute some of these results to suggestion, or to ovarian tissue left *in situ*. There is practically no evidence that either homotransplants or heterotransplants have been successful in the human female; though, in other animals, the sexual function appears to have been maintained in castrated individuals by transplants of all three varieties. "May we hope", says the author "that a more careful study of the subject from a scientific and experimental standpoint will reverse the unsatisfactory showing". [Hope springs eternal in the human breast! But for the person with ordinary common sense and a knowledge of medical history, the writings of F. H. Martin should be quite enough to show that ovarian transplantation is not worth further trouble. Those interested may refer to his long paper in *Surgery, Gynecology, and Obstetrics*, 1922, Nov., 573, where he gives references to 147 publications.—W. E. F.] (*See also* MEDICAL ANNUAL, 1923, p. 334.)

REFERENCES.—¹*Amer. Jour. Obst. and Gynecol.* 1922, Oct., 408; ²*Ibid.* Sept., 296.

OXYGEN THERAPY.

Herbert French, M.D., F.R.C.P.

The beneficial results of giving oxygen to new-born infants are described by Davidson.¹ The oxygen is allowed to flow at the rate of about three to five bubbles a second through the tube, which is placed on the infant's tongue like a spatula, while artificial respiration is carried on by Byrd's method with the baby lying in a bath of water at body temperature. He finds the results very successful in both the blue and the white types of asphyxia, in eclamptic infants, and in those born too soon after the dose of morphia has been given to the mother in twilight sleep.

Van der Starp² relates the case of an infant of fourteen months, moribund from pneumonia, in which the subcutaneous injection of oxygen two or three times a day produced rapid improvement. The injections were continued for a week; recovery ensued. This method is of the greatest value in the case of a suffocating restless child.

REFERENCES.—¹*Edin. Med. Jour.* 1923, May, 65; ²*Nederl. Tijds. v. Geneesk.* 1921, Oct. 1 (abstr. in *Jour. Amer. Med. Assoc.* 1921, Dec. 31, 2154).

PANCREAS, SURGERY OF.*E. Wyllys Andrews, M.D., F.A.C.S.*

Cysts of the pancreas are generally too large to permit hope of complete excision when they present themselves to the surgeon. As a consequence we are compelled to resort to the alternative of drainage. If the cyst wall is sewed into the skin a few will heal at once, others in a few months; but a very disagreeable minority acquire permanent pancreatic fistulas. Bonneau¹ advises a strict antidiabetic diet, and says that this will favour healing. In the great majority of cases, however, there is no secretion of pancreatic fluid, and the only thing which will ever cause a closure of the fistula is a complete eradication of its lining membrane. Such a procedure is at best very difficult, and Hamilton² suggests the use of **Radium** for this purpose. He reports but one case, but the effect was so striking that it may well represent a distinct advance not only in the therapy of this type of cyst but of others in which resection seems attended with danger. It would be expected that large doses would be needed for this purpose, and that little or no screening should be used, as it is the local effect which is sought. The following is the technique used: 25 mgrm., unscreened, were inserted into the depth of the fistula, left one hour, then left in three other areas, one inch nearer the surface each time as the capsule was pulled out—four hours in all. Six days later the same amount unscreened was left in three areas two hours each. Eleven days later, three capsules, one 50-mgrm., and two 25-mgrm., were run in in series and left one hour and ten minutes. Eleven days after this 25 mgrm. were inserted to the bottom and withdrawn 1 in. each hour for eight hours. It will be noted that not sufficient time was allowed to elapse between any two treatments for the reaction to subside, and therefore the effect was the same as using larger doses.

Acute pancreatitis is still a subject open to a wide variety of interpretations. Barling,³ Remijsne,⁴ and Zoepffel⁵ all emphasize the close clinical relation of the disease to gall-bladder pathology, and especially to cholelithiasis. All note that the pancreas shows some evidence of disease in about one-third of the cases of gall-stones. Each seems to be of the opinion that the route is biliary and not direct rather than lymphogenous. Barling calls attention to the fact that microscopic section often shows that there is a singular lack of involvement of the islets of Langerhans. This corresponds well with the clinical experience that glycosuria is frequently absent. Many of the attacks of pancreatitis are not recognized clinically at all, and they may be very common, as one would commonly mistake them for gall-bladder colic. These observers all think that there is considerable justification in advising early bile-tract surgery on account of the danger of pancreatic involvement.

Wood,⁶ in a very interesting contribution, reports two cases of pancreatitis of widely different type, and suggests that they may represent two modes of origin. This is a new suggestion: in the polemics now raging on the subject, both sides may be in the right. The first case was one of total necrosis of the pancreas. This is the type caused by the introduction of some substance into the pancreatic ducts which is capable of activating the enzymes. This may be either bowel contents or bile.

The second type is represented by a case presenting very much the same picture. However, at operation it was found that the infection was localized, and considerable evidence is brought forth that this type is lymph-borne, from adjacent infected organs. This point is certainly worthy of study, and careful analysis of our cases with this in mind may throw considerable light on the matter.

REFERENCES.—¹*Presse méd.* 1922, Aug. 16; ²*Surg. Gynecol. and Obst.* 1922, Nov.; ³*Brit. Med. Jour.* 1923, April 28; ⁴*Jour. Amer. Med. Assoc.* 1922, Aug. 19 (abstr.); ⁵*Berlin. klin. Woch.* 1923, Jan. 26; ⁶*Edin. Med. Jour.* 1923, May.

PAPAVERINE.*Drs. C. Lian and R. Barrieu.**(Translated by Carey F. Coombs, M.D., F.R.C.P.)*

This alkaloid of opium is but little used in spite of Pal's¹ work on the subject a decade ago. He showed that it possesses the power of relaxing the unstriated muscle of various viscera and of the blood-vessels. It may therefore be used in visceral and vascular spasm, prescribed in the form of pills each containing .05 gm., 2 to 5 pills per day, but as much as 1 gm. may be given in twenty-four hours.² Subcutaneous injections beginning with .03 to .05 gm., rising later to .1 gm. or more, may also be given, or even intravenous injections rising from .01 or .02 up to .08 gm.³ It has been given to children for pylorospasm;⁴ and has been prescribed for asthma, dysmenorrhœa, etc. In hyperpætics it has been used for anginal attacks, and generally for such accidents as may arise from paroxysmal vasoconstriction.⁵ Yet Pal himself,⁶ like Macht, of Baltimore, taking into consideration the high price of papaverine, prefers actually to give salts of benzyl, which are equally active antispasmodics, and less toxic.

REFERENCES.—¹*Wien. med. Woch.* 1913, April 19; ²*Deut. med. Woch.* 1923, April 27; ³*Berl. klin. Woch.* 1916, No. 46; ⁴*Wien. klin. Woch.* 1914, April 2; ⁵*Presse méd.* 1923, May 19 and June 2; ⁶*Wien. klin. Woch.* 1921, Sept. 8.

PARALYSIS. (See HYSTERICAL PARALYSIS OF THE LOWER LIMB; NEUROSYPHILIS; PARAPLEGIA, TRAUMATIC.)

PARALYSIS, SURGERY OF. (See BONE AND JOINT SURGERY.)

PARANOIA.*C. Stanford Read, M.D.*

Hoven¹ discusses the antisocial reactions of hallucinated paranoiacs, which can be grouped into the active or aggressive reactions against the supposed persecutors, and the passive reactions against the persecuted patient himself, either to escape from his persecutors or in obedience to his hallucinations. These latter often are harmless, as keeping the eyes closed or the ears stopped up, but may consist of suicidal attempts, self-mutilation, refusal of food. The possibility of suicide in such paranoiacs is stressed, and other observers are quoted on the point.

REFERENCE.—¹*Arch. méd. Belges*, 1923, Jan.

PARAPLEGIA, TRAUMATIC.*Sir James Purves-Stewart, K.C.M.G., C.B., F.R.C.P.*

Amongst the most tragic war wounds are those of the spinal cord, producing paraplegia, partial or complete. Gotch¹ has studied a series of 56 such cases at Gifford House, Roehampton, and has recorded some valuable observations as to their prognosis and treatment. The average age of these gallant fellows at the time of injury was 21. All of the cases when first seen had been wounded for at least three years, and some for five or six years. Of the 56 cases, 39 were complete transverse lesions, varying in level from the 4th to the 10th thoracic segment; 17 were incomplete transverse lesions, ranging from the 8th thoracic to the lower lumbar segments.

Complete Transverse Lesions.—Two well-marked types can be distinguished—those with flaccid paralysis (paraplegia in extension), and those with spastic paralysis (paraplegia in flexion). Both types have an equal degree of motor and sensory paralysis, extending up to the level of the lesion.

In the *flaccid* type there is complete absence of all reflexes, deep and superficial, and the lower limbs lie motionless, wasted, and shiny.

The *spastic* cases, on the other hand, show exaggeration of the deep reflexes, with knee- and ankle-clonus and extensor plantar reflexes. The limbs are

irritable to small stimuli : stroking or blowing on the skin-surface will generally induce involuntary contraction, the thigh becoming flexed on the abdomen. A slight degree of irregular wasting of one or both lower limbs is observed, and the motor and sensory loss is as complete as in the flaccid cases.

In both types there is complete loss of voluntary control over the bladder and rectum.

Incomplete Transverse Lesions.—These cases also fall into two types, the spastic and the flaccid.

The *spastic* cases have brisk tendon reflexes, ankle-clonus, and extensor plantar responses ; the abdominal reflexes are usually absent. A certain amount of irregular wasting of the leg and thigh muscles may be present, but the power of voluntary movement is considerable, especially after adequate massage. Walking, however, is generally difficult, owing to so much energy being expended in overcoming the spasticity.

In the incomplete *flaccid* cases, either all reflexes in the lower limbs are absent, or the knee-jerk is just elicitable in one or both limbs. According to Gotch, the knee-jerk, if present, is not altered by reinforcement. One smart tap will elicit it, but a series of taps, even with the patient's hands clenched, etc., do not alter its character. There may be considerable wasting, especially of the calf muscles : systematic massage can improve this very noticeably. The deep reflexes, however, do not alter.

Voluntary movement in these incomplete cases varies. Most patients can stand and walk with aid, the motive power seeming to be derived from the muscles of the pelvic girdle. The cutaneous anæsthesia is patchy and variable, the majority showing an irregular area of anæsthesia in the saddle area. The loss of kinetic sense and of joint sense is generally severe, so that nearly all the patients who can walk only succeed in doing so by looking at their feet : they cannot walk in the dark.

The bladder and rectal functions show a varying degree of departure from the normal. The majority of patients with incomplete lesions are aware of the desire to pass water and can control the passing of it—provided the bladder is not too full and the weather not too cold. Occasionally retention occurs and for a few days a catheter has to be passed or retained. Five of Gotch's cases have almost normal bladder control but complete rectal incontinence, whilst three cases have no bladder control but normal rectal control. Sexual impotence is invariable, although priapism is a common and distressing symptom.

Special Symptoms in Complete Lesions, and their Treatment.—In the complete type of paraplegia there are certain *special* symptoms which do not occur in incomplete lesions.

Paroxysmal pains in the lower limbs, of great intensity, requiring Aspirin, Saltpyrin, or even Morphia injections, may occur from time to time. The pain is felt all down both lower limbs. It is associated with a rise of temperature, not above 101° in uncomplicated cases. The duration of these attacks is usually from twenty-four to forty-eight hours ; if they last longer, some other factor is responsible, such as septic infection of an old bed-sore or an attack of renal colic. Gotch confesses himself unable to account for these paroxysmal leg pains, but suggests that they may have their origin in the sympathetic ganglia outside the spinal cord. Nearly all patients with complete transverse lesions complain of a continual sensation of *tingling in the lower limbs*, but this is not described as painful.

Flatulence is a common and frequently an acutely painful complaint in complete transverse lesions. Well-marked abdominal distention with ladder-like peristalsis is observed, sometimes so great as to suggest intestinal obstruction. As a rule, however, there is no vomiting, but there are constant eructations

and the passage of flatus per anum. Although such cases look acutely ill, they are, relieved by a single injection of $\frac{1}{2}$ to 1 c.c. of **Pituitary Extract**, posterior lobe, or, in milder cases, by 10 min. of 1-1000 **Adrenalin**.

Attacks of *renal colic* are a common and serious complication, unilateral or bilateral. A distinct mass is often palpable in the renal region during the attack, such mass being due to distention of the renal pelvis with pus and calculi, the surrounding renal substance being grossly fibrotic. Following the attack of renal colic there is usually blood-stained and purulent urine for several days.

In cases of complete paraplegia with total loss of control of the bladder, although the urine may appear clear and free from pus by gross tests, there is always present a cloud of albumin on boiling after adding acetic acid. Microscopically we always find evidence of renal destruction in the form of pus-cells with renal and bladder epithelium. At any time this process may suddenly become acute, resulting in a rapidly developing *pyonephrosis*, with an increasing mass in either loin, high fever, and cystitis, prostatitis, orchitis, or epididymitis. Chronic fever in such patients is often due to urinary sepsis.

The last stage of these complete paraplegics is the development of *uræmia*. Sometimes the symptoms develop within a few hours, consisting in suppression of urine with uræmic asthma, drowsiness, twitching, and finally coma. In other cases the symptoms may extend over several days, intractable vomiting and headache being prominent symptoms. Curiously enough, Gotch has never observed renal cedema of the eyelids, face, or back, in any of these cases, even in patients who have had repeated attacks of uræmia. Post mortem in such cases we find the kidneys reduced to mere abscess cavities with fibrous walls, the interior being filled with calculi and pus. Mild cases of uræmia may recover under prompt injections of **Pilocarpine**, combined with **Hot Packs** and **Abundant Fluids** by the mouth; but no case, however mild otherwise, has recovered when twitching has been present.

The *bed-sores* of complete transverse lesions are conveniently divided into wet and dry. An old dry bed-sore may remain stationary for years, and, unless very roughly handled, will not cause any trouble. A discharging bed-sore, on the other hand, may defy the most energetic treatment. The reaction towards healing seems to depend more on the general than the local condition. As a rule **Dry Dressings** for dry bed-sores and **Wet Dressings** (preferably hot) for wet sores give the best results.

PROGNOSIS AND TREATMENT.—Cases of *incomplete transverse lesion with recovered bladder function* show a gradual tendency to improve. Daily **Massage**, systematic **Walking Exercises**, and encouragement in **Self-confidence** all help in this improvement. Such patients may with confidence be told that they will lead useful if restricted lives, and that no relapse need be feared.

The *completely paralysed patient*, however, is in a different category. His progress cannot be otherwise than gradually downwards. The most we can hope for, is to retard that downward progress as much as possible. Expert **Nursing**, **Massage**, and **Suprapubic Drainage** of the bladder are the essentials of his treatment. Gotch is convinced that the cases of complete transverse lesion who have retained their suprapubic drainage apparatus have in all instances lived longer and been much freer from intercurrent complications than those without. Some of these cases with suprapubic drainage were wounded six or seven years ago and have hardly experienced the slightest discomfort. None of the patients with suprapubic drainage have shown acute pains in the lower limbs, abdominal distention, or prolonged fever. All the cases which showed these symptoms have either never had suprapubic cystostomy, or the original suprapubic opening had been closed at some later date in their paraplegic history. Out of 8 fatal cases, only 2 were in suprapubic

cases, one of whom died of septic arthritis accidentally caused through injury; the other case died from uræmia. There seems therefore no doubt that, so far as the patient's general condition is concerned, suprapubic drainage has a great advantage over a closed automatically-acting bladder. The bladder should be washed out twice daily and the tubing changed. The best type of rubber drainage-tube is an œsophageal tube. A solution of Potassium Permanganate, 1-8000 or 1-10,000, is the most effectual irrigating lotion. Gotch also prescribes a routine mixture thrice a day, containing:—

R	Urotropini	gr. x	Syrup. Aurantii	℥j
	Ammon. Benzoat.	gr. xv	Aq.	ad ℥j
	Tinct. Hyoscyami	℥xxx		

Ammonium benzoate, when taken over long periods, does not cause digestive upsets like the acid sodium phosphate. The foregoing mixture generally keeps the urine at a constant level of acidity. The hyoscyamus diminishes the tendency to acute retention in cases without suprapubic drainage.

In cases without suprapubic drainage a retained catheter is used if there is any tendency to spasmodic retention. No ill effects have been found to result from retaining a catheter for an indefinite period. Any urethritis which may result can be easily controlled by sufficient lubrication of the catheter and by urethral irrigation with 1-8000 potassium permanganate solution.

Massage of the lower limbs, and of the spinal and abdominal muscles, is essential in all cases of paraplegia, whether complete or incomplete. Without it the patient quickly develops contractures, bed-sores tend to appear on the feet, and his general condition deteriorates. Massage should be given daily.

The importance of nursing in these cases cannot be over-estimated.

To sum up, in cases of complete transverse lesion, the prognosis cannot be other than ultimately fatal, but in the absence of definite uræmic symptoms it is almost impossible to predict an immediately fatal issue. On the other hand, even when the patient's general condition is otherwise good, the appearance of any uræmic nervous symptoms is inevitably fatal, and in such cases it is safe to predict coma and death. Acute hæmorrhagic cystitis is always rapidly fatal, and may come on without warning at any time during the patient's paraplegic life. Gotch has seen two deaths from this condition, both of them in patients without suprapubic drainage.

The main factors influencing prognosis are continued and skilled nursing, daily massage, and establishment of adequate bladder drainage, preferably by the suprapubic method. Closure of a suprapubic opening which the patient has had for some years and which is giving no local trouble is entirely contra-indicated. In five such cases where the suprapubic opening was closed, in every case fresh symptoms appeared, such as bed-sores, limb-pains, fever, and malaise, which had not been manifest previous to the closure.

Lastly, encouragement of mental confidence and mental occupation are of importance. An auto-wheel-chair is found to be invaluable, enabling the patient to get about and to enjoy life, and generally assisting him in forgetting the tragic aspects of his disability.

REFERENCE.—¹*Brit. Med. Jour.* 1923, i, 849.

PARASITES, INTESTINAL. (See INTESTINAL WORMS.)

PARATYPHOID FEVER. (See also TYPHOID FEVER.) *J. D. Rolleston, M.D.*

EPIDEMIOLOGY.—L. Tietz¹ describes an epidemic of about 150 cases of paratyphoid fever A at Königsberg. The actual number of cases was probably considerably higher, as only a small proportion had a severe attack, in which the symptoms corresponded to those of moderately severe typhoid fever. The source of infection could not be discovered.

PATHOLOGY.—E. Fraenkel,² from a study of the roseolæ in paratyphoid, was able to show that, as in the case of typhoid fever, they are bacterial metastases in the lymphatic vessels of the skin. The roseolæ may last as long as eighteen days before there is the slightest histological evidence of retrogression. In one instance in which an excised papule showed abundant bacilli, no paratyphoid organisms could be found in repeated blood cultures, although they were present in the feces and the patient's serum had a high agglutinating power for *B. paratyphosus B*.

SYMPTOMS AND COMPLICATIONS.—E. Frommel and E. Grasset³ report a case of paratyphoid A complicated by *gangrene of the tonsil*, which has not hitherto been described as a complication of typhoid or paratyphoid fever. The patient was a girl, age 18, in whom the tonsillar symptoms preceded the development of paratyphoid fever by a few days. Blood cultures post mortem showed the co-existence of paratyphoid A and streptococcal infection. A diagnosis of paratyphoid was not made until the autopsy, which showed enlarged and—in parts—ulcerated Peyer's patches and solitary follicles.

A. E. Mortimer Woolf¹ describes a case of *localized peritonitis due to intestinal perforation* in paratyphoid fever B. The patient was a boy, age 15, who developed acute abdominal pain on the fifteenth day of disease, with tenderness in the right loin and right iliac region, where a mass could be felt. Operation was performed, and a perforation was found in the lower end of the ileum, which was walled off from the general peritoneal cavity by the great omentum. The perforation was closed, and recovery was uneventful. Woolf remarks that perforation in paratyphoid is rare. Of 1038 cases of paratyphoid B in Webb-Johnson's statistics, there were 3 instances of intestinal perforation, or 0.29 per cent, whereas in paratyphoid A perforation was commoner, there being 2 with this complication among 344 cases, or 0.55 per cent. On the other hand, Vincent and Muratet maintain that the infrequency of perforation in paratyphoid only holds good in civil practice, as during the war hemorrhage and perforation were almost as frequent in paratyphoid as in typhoid. The literature shows that when perforation occurs in typhoid or paratyphoid, general peritonitis almost always results. Although there are a few cases on record of localized peritoneal abscess due to typhoid, Woolf's case is apparently the first example of the kind occurring in paratyphoid fever.

According to H. Taberlet,⁵ who records 22 cases, *paratyphoid suppuration* is usually secondary to paratyphoid fever, but it may occur apparently as a primary condition. In such cases, however, it is always the consequence of a general blood infection. All the organs may be infected, including the bones, joints, peritoneum, bile-ducts, meninges, thyroid, lungs, pleura, urinary tract, testes, and subcutaneous connective tissue. The prognosis is generally favourable. The gravity of the fatal cases is due to the localization of the suppuration and not to the pyogenic agent. Paratyphoid suppuration may be persistent, and those suffering from it may be carriers when it is localized in the bile-ducts, urinary tract, or bones. Apart from suppurative peritonitis immediate operation is not required. Complete recovery usually takes place after incision, and sometimes after simple evacuant puncture. Of Taberlet's 22 cases, 8 were due to *B. paratyphosus A*, and 10 to *B. paratyphosus B*, while in 4 the variety of paratyphoid organism was not identified.

K. Pesch⁶ reports a case in a man, age 36, of *abscess in the left epididymis* in which a pure culture of *B. paratyphosus B* was found. There was no history of intestinal disease, and the source of infection was not discovered.

Carnot and Blamoutier⁷ report the first case on record of *suppurative thyroiditis* due to *B. paratyphosus B*, although a case due to *B. paratyphosus A* had previously been described by Lemierre and Taberlet (see MEDICAL ANNUAL,

1920, p. 265). Unlike the other cases of typhoid or paratyphoid thyroiditis, the patient, a woman, age 26, had not previously had a goitre, but the thyroid had apparently always been normal. On the other hand, there was a familial predisposition to the complication, as her aunt had died from Graves' disease, and her sister had developed a goitre after pneumonia. Post-typhoid thyroiditis is usually a complication of convalescence, but in the present case the first symptoms appeared only five days after the onset of the disease, although suppuration did not occur until convalescence.

Although albuminuria without other signs of renal involvement is not uncommon in typhoid or paratyphoid fever, *nephritis* is decidedly rare. It may occur either as an initial symptom, as in the rare cases of nephrotypoid described by French and German writers, or much more frequently at the height of the disease. Uræmic symptoms and œdema are very rare. The prognosis is favourable in the great majority of cases, the albumin disappears entirely in convalescence, and chronic nephritis very rarely ensues. J. Chalièr and R. Desjacques⁸ report the case of a woman, age 21, who in the second week of paratyphoid fever B developed nephritis accompanied by œdema, casts, hæmoglobinuria, and retention of chlorides. The nephritis lasted twenty days, and then cleared up without leaving any trace.

H. Kleinschmidt⁹ reports a case of paratyphoid fever B in an infant, age 6 months, in which *pyelocystitis* and *meningitis* were the first symptoms, and it was not until some days later that a transient diarrhoea occurred, when *B. paratyphosus B* was found in the stools. The autopsy showed well-marked colitis and extensive pigmentation of the intestinal mucosa.

E. Wordley,¹⁰ of Plymouth, who records a sporadic case of fever due to *B. paratyphosus C* in a girl, age 13½, states that only two previous cases have been reported in England. The disease, however, is possibly commoner than is supposed, as in many cases agglutinins are not formed in the blood, and the diagnosis can only be made by the isolation of the organism from the blood-stream, or more rarely from the fæces.

H. Eschbach and A. Laprade¹¹ report a case illustrating the *association of paratyphoid fever and pulmonary tuberculosis*. The patient was a girl, age 15, who, in the course of a continued fever which proved to be paratyphoid B, developed signs of pulmonary congestion, which was first regarded as due to paratyphoid, as in the cases described by Lemierre and Deschamps (see MEDICAL ANNUAL, 1922, p. 483). The presence of tubercle bacilli in the sputum rectified the diagnosis. Recovery took place from paratyphoid fever, but death occurred later from pulmonary tuberculosis.

REFERENCES.—¹*Deut. med. Woch.* 1922, 1034; ²*Med. Science*, 1922, v, 431; ³*Rev. méd. de la Suisse Rom.* 1923, 92; ⁴*Brit. Jour. Child. Dis.* 1923, 91; ⁵*Med. Science*, 1923, vii, 363; ⁶*Méd. Klin.* 1922, 1287; ⁷*Bull. et Mém. Soc. méd. Hôp. de Paris*, 1923, 66; ⁸*Paris méd.* 1923, i, 503; ⁹*Med. Science*, 1923, viii, 365; ¹⁰*Brit. Med. Jour.* 1923, ii, 105; ¹¹*Bull. et Mém. Soc. méd. Hôp. de Paris*, 1923, 112.

PELLAGRA.

Sir Leonard Rogers, M.D., F.R.C.P., F.R.S.

J. Goldberger and W. F. Turner¹ report further experience on the influence of deficient proteid diet in pellagra, and record a case developing the disease in spite of being for several months previously on a diet rich in all forms of vitamins and mineral elements, and only deficient in proteins, and which quickly cleared up on supplying additional protein in the form of an extra pint of fresh milk; and one in which pellagra appeared in a patient who had consumed no maize for seventeen months. They suggest that the rare cases of the disease in breast-fed infants are due to an inadequate supply of the milk. J. W. Jobling and L. Arnold² dispute Goldberger's view of protein deficiency as the cause of pellagra, and maintain that the rapid but temporary increase of the

disease in 1909 and 1913 cannot be thus explained, pointing out that an excess of carbohydrate food may afford suitable cultural conditions for an intestinal organism responsible for the infection. The influence of light on the development of the disease has been little investigated, although several observers have suggested that pellagra might be a photodynamic intoxication, and photodynamic substances have been obtained from corn; but this cereal is little eaten in the affected states, so the writers have sought for and succeeded in isolating a photodynamic organism from the stools, and from the intestines post mortem in one case, on the medium used by Currie for studying the production of citric acid by fungi to which are added potassium iodide 3 per cent, starch 1 per cent, and agar 2 per cent; this turns blue in a bright light if a photodynamic substance is present. The fungus apparently belongs to the *Aspergillus glaucus-repens* group. The fluid media becomes fluorescent when made slightly alkaline, the fluorescent substance being soluble in lipoids, and when injected into mice, and the animals are exposed to light, œdema and swelling, reddening of the ears, and even death resulted, and with repeated doses the ears dropped off and the tail became rough and scaly. The organisms have been isolated from the majority of pellagra cases, but never from fifty controls.

M. Hindhede³ also disputes Goldberger's conclusions on the basis of his extensive studies of metabolism, in which he tested diets on himself and other human subjects, and proved that good health can be maintained for long on vegetable proteids totalling only 20 grm. per day without fat (which vegetables can also replace), whole rye-bread, potatoes, margarine, and barley-meal porridge all supplying sufficient protein, while bran can be digested by man and replace both meat and milk, vitamins also being ample on such diets. He severely criticizes McCollum and also 'McKay's' (McCay) dietetic experiments, and states that the data of the last-named "prove just the opposite of what the author means them to"; and he (Hindhede) thinks pellagra is due to a deficiency of vitamins and not of proteids.

G. C. Shattuck⁴ deals with the factors influencing the development of pellagra, and gives evidence to show that chronic alcoholism and eccentricity of diet have most effect in predisposing to the disease. J. G. Huck⁵ gives a full summary of the literature on the blood changes in pellagra, and records numerous careful observations of his own, from which he concludes that the disease shows a secondary type of anemia with normal total leucocyte count, but an increase of the lymphoid elements during active symptoms, followed by excess of eosinophils during convalescence, the latter change auguring a favourable prognosis.

R. Hutchison and D. Paterson⁶ record two cases of pellagra in children who have never been out of England, and whose diet had not been deficient in proteins, and they think many such cases remain undiagnosed.

REFERENCES.—¹*Jour. Amer. Med. Assoc.* 1922, Dec. 23, 2132; ²*Ibid.* 1923, Feb. 10, 365; ³*Ibid.* June 9, 1685; ⁴*Boston Med. and Surg. Jour.* 1923, June 7, 889; ⁵*Johns Hop. Hosp. Bull.* 1923, May, 157; ⁶*Brit. Med. Jour.* 1923, Oct. 13,

PEMPHIGUS NEONATORUM. (See SKIN DISEASE IN CHILDREN.)

PERNICIOUS ANÆMIA.

Herbert French, M.D., F.R.C.P.

In an extract from the *Finska Lakäre-Sällskapets Handlingar*,¹ mention is made of fourteen cases treated by Transfusion or Injection of Blood. It states that in three cases blood transfusion had a very favourable influence, one man being still well after two years, so that one is led to conclude that in the majority the results were not satisfactory. One case of a woman is described in whom,

after a single intramuscular injection of defibrinated blood, marked improvement occurred, and she has felt entirely well during the eight years which have elapsed since this was done.

Knud Faber² describes a case in a woman of 76 who was apparently cured of undoubted pernicious anæmia by Kefir taken by the mouth, kefir being milk fermented with the *Bacterium caucasicum*, and relates that a trial of this method of treatment was made in a series of cases. A second case was also remarkably good, but none of the subsequent cases so treated have shown such satisfactory results. He states that in Copenhagen they have also tried intramuscular injections of kefir and of ordinary sterilized milk without permanent benefit, although a transitory improvement in the blood condition has followed in most cases.

REFERENCES.—¹*Finska Läk.-Sällsk. Handl.* 1922, Nov.-Dec., 591 (abstr. in *Jour. Amer. Med. Assoc.* 1923, March 10, 736); ²*Presse méd.* 1922, Oct. 11, 873.

PINK DISEASE. (See ERYTHREDEMA.)

PITYRIASIS ROSEA.

E. Graham Little, M.D., F.R.C.P.

Highman and Rulison¹ review present opinions on this disease, and offer some personal views based on the study of 74 cases, for only 52 of which, however, the records are at all complete. It is their experience that the frequency of the disease, as expressed by a curve, rises twice in the year, in the spring and fall. In their series the highest point was reached in March, and they had no case whatsoever in July. An analysis of the 52 cases showed 30 females, 22 males. Two-thirds of the cases occurred between the twenty-first and fortieth year, an incidence which is rather at variance with European statistics, which commonly show greater frequency in the second and third quinquennia and progressive decline after that time. It is somewhat remarkable that the herald patch is reported as having been found in all the fifty-two cases. Another remarkable finding is that the general eruption was separated from the appearance of the herald patch by very prolonged periods, two weeks in 9 cases, eighteen days in 2 cases, three weeks in 1 case, five weeks in 4 cases, six weeks in 2 cases, and twelve weeks in 1 case, a duration which is very unfamiliar to European observers. The longest duration of the disease observed was six weeks. All the symptoms point to the disease being of external origin, and the authors maintain that it is an infectious disease following definite seasonal epidemic laws. In the discussion which followed this interesting paper, Hazen thinks a case might be made out for internal causation, especially for tonsillar infections, which he has found in practically every case of a series of some 150. The same author has seen recurrences in the same patient more than once. Pollitzer, who is a past master in statistical information, states that the ratio of the disease in American dermatological practice is about 1 per cent. As regards treatment, inasmuch as the disease disappears spontaneously within variably short times, little need be done beyond helping the patient if there is pruritus, which is usually inconsiderable. It is especially important not to overtreat the rash, which may easily be inflamed by injudicious applications.

REFERENCE.—¹*Arch. of Dermatol. and Syph.* 1923, Feb., 163.

PITYRIASIS RUBRA PILARIS.

E. Graham Little, M.D., F.R.C.P.

Zeisler² describes four cases of this disease in one family, a father and three children. The father had had the eruption since early childhood; treatment by medication and injections of pilocarpine seemed to improve him greatly. He married, and of four children born within the next ten years, three, one boy and two girls, developed the disease during the first year of life. When seen,

the children, ages respectively 12, 14, and 16, showed perfectly definite eruptions, confirmed by histological examination. There was a history of tuberculosis as well in the family—a point of interest, as Milian has long regarded this disease as a tuberculide. The most useful drug in treatment of these cases was found to be Thyroid, which seemed to control the disease but failed to cure. Locally, free use of baths followed by some mild emollient is recommended, and X-rays may aid the involution of the lesions.

REFERENCE.—¹*Arch. of Dermatol. and Syph.* 1923, Feb., 195.

PLAGUE.

Sir Leonard Rogers, M.D., F.R.C.P., F.R.S.

EPIDEMIOLOGY.—L. F. Hirst¹ records further experimental work on the transmission of plague from one rat to another by means of rat fleas of different species of *Xenopsylla*. In Colombo he formerly found all the species to be *X. astia*; during a recent outbreak of plague in a limited area of the city near the port, however, he found *X. cheopis* in the affected area, and that its distribution on rats was irregular, but related to rat and human plague. The *X. astia* bites man reluctantly under tropical conditions, while experiments carried out under parallel conditions with both fleas showed that *X. cheopis* was much the more efficient carrier of the two, and alone showed the blocking of the entrance to the stomach with regurgitation of the plague bacilli, which Martin and Bacot showed to be such an important factor in plague infection by these insects. Numerous attempts to transmit plague during the plague season from rat to rat and mouse to mouse by *X. astia* gave negative results. He holds that rat flea surveys promise to be of great value in forecasting the probable incidence of plague, those parts of the East Indies where *X. cheopis* prevails being liable to plague epidemics, while those where only *X. astia* occurs are likely to be relatively immune to the disease. F. W. Cragg² also records further work on the distribution of rat fleas in India in relation to plague prevalence; he has now examined 23,657 fleas collected in different provinces, and has found a definite correlation between a high percentage of *X. cheopis* and a low one of *X. astia* and the prevalence of plague, which is most marked in a group of ports with similar climates always more or less favourable to the reproduction of fleas, and where the seasonal prevalence of plague is not well marked, and least so in the Punjab, where climatic variations most influence plague prevalence; thus supporting the view that only *X. cheopis* is a good carrier of plague.

Bordas, Dubief, and Tanon³ record observations on the rat as a reservoir of plague infection, based on the examination of 5000 rats in the neighbourhood of Paris, among which they found 29 infected with plague, mostly of a chronic and easily-overlooked nature in the absence of microscopical and bacteriological examinations of the spleen post mortem, as no characteristic naked-eye lesions may be found. The bacilli found in such cases are somewhat attenuated, but may recover their virulence after passage through animals, and these rats form a reservoir of the virus, enabling it to be carried on from one plague season to another in the absence of plague cases in man, and to break out again without re-importation of the infection.

J. S. Purdy⁴ deals with the Sydney epidemic of 1921–2 with 35 cases and 8 deaths, much fewer than in that of 1900 with 303 cases and 103 deaths. The best prophylactic measures are rat-proofing of houses, cyaniding to kill rats and fleas, incineration of garbage, and trapping and poisoning to reduce rats, although it is impossible to exterminate them, as one pair can produce 680 progeny in nine months.

REFERENCES.—¹*Ind. Jour. Med. Research*, 1923, Jan., 789; ²*Ibid.* April, 953; ³*Presse méd.* 1922, Sept. 27, 831; ⁴*Med. Jour. of Australia*, 1923, March 10, 275.

PLEURISY.*W. H. Wynn, M.D., F.R.C.P.*

Eosinophilic pleural effusions have been reported in association with many conditions, such as trauma, sepsis, typhoid, syphilis, pneumonia, chronic arthritis, septic endocarditis, neoplasms, and influenza; but in no case was it possible to prove that the primary disease was the sole etiological factor in the atypical effusion. Clarke¹ reports the case of a young woman with a left-sided pleural effusion. Cytological examination showed at first 550 cells per c.mm., 70 per cent of which were eosinophils and 30 per cent lymphocytes. A week later the fluid showed 2200 cells per c.mm., and 100 per cent were lymphocytes. The presence of tubercle bacilli was proved by inoculation of a guinea-pig. Of the 70 cases recorded of eosinophilous pleural effusion, this is the only one in which the tubercle bacillus has been demonstrated. The eosinophilia appears to be a phase intermediate between the polymorphonuclear and lymphocytic phases of the fluid, and the condition should not be regarded as etiologically distinct.

Neuland² examined 45 cases of serous pleurisy in children by the intracutaneous tuberculin test, and found no reaction in 10. He therefore concludes that every case of pleurisy of unknown cause in childhood is not necessarily due to tuberculosis, and that serous pleurisy in children is not so closely connected with tuberculosis as in adults. He also found that of 24 children who at the time of the pleurisy were infected with tuberculosis, 18 remained healthy after an interval of from one to ten years, 2 showed signs of active tuberculosis, 1 of inactive tuberculosis, 1 had tuberculosis of the spine, and in 2 there were doubtful signs of tuberculosis.

Nobel³ also holds that the prognosis of pleurisy in children is favourable, though he believes that the disease is almost always tuberculous. Inquiry into the subsequent history of 78 cases showed that 13 had died, 26 could not be traced; and of 39 who presented themselves for examination from a few months to nineteen years after the pleurisy, 17 (or 43·6 per cent) had completely recovered, 14 (or 36 per cent) had only a slight indication of their previous illness, and only about 10 per cent had severe sequelæ such as disease of the corresponding lung, displacement of the heart, or scoliosis.

TREATMENT.—Henius⁴ records two cases showing that by the performance of a small **Pneumothorax** it is possible to cure the pain, which is often very severe in dry pleurisy. This method also prevents adhesions after the pleurisy, especially on the left side, as in addition to pain, disturbance of the heart's action may arise owing to pleuropericardial adhesions. Hess, commenting on this paper, states that artificial pneumothorax is used not only in pulmonary tuberculosis but in the following conditions: (1) In pleurisy and hæmothorax for the prevention of adhesions; (2) For the relief of pain in chronic pleurisy and acute febrile pleurisy and pneumonia; (3) For the separation of adhesions in pleurisy, especially after gunshot wounds. The best results were seen in recent cases, but even in old-standing cases fair results were obtained by making a small pneumothorax with frequent refills.

Wynn⁵ has also, in cases of acute pneumonia with severe pain, separated the pleural surfaces by the introduction of a small quantity of **Oxygen**. The procedure gives immediate relief, and patients previously restless and crying out with pain become calm and may go to sleep.

Lunde⁶ describes a new method of treating pleural effusions based on the hypothesis that there is a disturbance of the calcium-sodium balance in the tissues, there being a comparative deficiency of the former and a comparative excess of the latter. This favours retention of water in the organism. He gives **Foods with a High Calcium Content**, especially milk and eggs, and as the fat-soluble vitamin is of importance in calcium metabolism, **Cod-liver**

Oil is added. Salted foods and carbohydrates are restricted. Two teaspoonfuls three times a day of the following mixture are prescribed: Calcium Chloride 30, Potassium Acetate 60, water 285, in order to facilitate the removal of sodium as sodium carbonate. Regular, slow, and deep respirations are encouraged, to improve the action of the heart and promote alternate filling and emptying of the vessels of the chest and abdomen. The treatment has been found especially useful for the effusions occurring after artificial pneumothorax.

REFERENCES.—¹*Jour. Amer. Med. Assoc.* 1922, Nov. 4, 1591; ²*Med. Science*, 1923, April, 17; ³*Ibid.*; ⁴*Ibid.*; ⁵*Lancet*, 1922, ii, 493; ⁶*Tubercle*, 1922, Nov., 57.

PNEUMONIA.

W. H. Wynn, M.D., F.R.C.P.

In 1921 pneumonia was responsible for 34,708 deaths in England and Wales, apart from those due to diseases in which it is the chief secondary complication, such as measles, whooping-cough, and influenza. To these must also be added the cases in which a terminal pneumonia is the last phase in chronic maladies such as valvular disease of the heart. All attempts to seek the cause of this excessive mortality are to be welcomed, and the bacteriology and specific therapy are engaging the attention of many workers.

SYMPTOMATOLOGY.—Lyon¹ has studied the clinical aspects of 208 cases of pneumonia in infants and children under 12. Lobar pneumonia was quite common even in the youngest patients, and there were 109 cases of lobar and 99 cases of lobular pneumonia. In the lobar cases the mortality increased with the age of the child. There were 12 cases in infants under 2, with no deaths; 28 between 3 and 5 years, with no deaths; and 69 in those from 6 to 12, with a death-rate of 7·3 per cent. Lobular pneumonia gave quite a different picture of mortality. The greatest number of cases and the highest death-rate occurred under 2 years of age—52 cases and 50 per cent of deaths. There was a gradual fall with increasing age. There were 25 cases in children of 3 to 5, with a death-rate of 28 per cent, and 22 cases from 6 to 12, of whom 9·1 per cent died. The death-rate in all cases of lobular pneumonia was 35·4 per cent, and it is a much more serious disease in children than lobar pneumonia. In the lobar cases diminution of the breath sounds over the affected lobe was often the only clinical sign, and Lyon corroborated his findings by the use of the fluoroscope. There was little tendency for the disease to spread to another lobe. Cough was not so troublesome as in bronchopneumonia. Pain was often referred to the abdomen, and vomiting was common. In the majority the temperature fell on the sixth or seventh day. In four cases the disease lasted more than eleven days without complication. Crisis occurred in 40 per cent. Empyema occurred in 5·5 per cent, and all recovered after operation. Otitis media occurred in 4·6 per cent. In bronchopneumonia consolidation was much more common in the lower lobes. In 73 of the 99 it was double. In many cases marked physical signs were found in a few hours. As a rule symptoms developed gradually; vomiting was common, but sharp pleuritic pain was not found so often as in lobar pneumonia. Cyanosis was three times as common, and was seen in 27·2 per cent. Twenty-four cases lasted seven days or less, 6 from seven to fourteen days, and 3 cases lasted more than twenty-eight days. Decline by lysis was the rule, but in 2 crisis occurred. In 62 cases the bronchopneumonia was secondary to some other disease. Empyema occurred in 5 per cent, and four died; acute otitis media occurred in 13·7 per cent, and an acute fibrinous pericarditis once.

It is not sufficiently recognized how often pneumonia is a cause of death immediately after birth. Browne,² in a series of 80 deaths, found 21 were due to pneumonia; 11 deaths were of premature and 9 of full-time infants

from eight hours to nine weeks old. If it is taken that there is one premature to every 10 full-time infants, then the premature is 14 times more liable to die of pneumonia; 5 of the babies were syphilitic, so syphilis was a possible determining factor. Several kinds of lesions were found, such as catarrhal pneumonia, which accounted for half the deaths; but the most interesting form, which is described at length, is acute hæmorrhagic pneumonia, the lungs showing congestion and œdema with hæmorrhages into the alveoli and bronchi.

In weaklings and premature babies, Nobel³ points out the difficulty of diagnosing pneumonia from physical signs, and thinks the general signs of infection more helpful. A peculiar grey coloration of the skin or a mixture of pallor and cyanosis may be the most important sign. Fever is generally absent, and a low temperature with marked disturbance of heat regulation is common. Frequency of respiration is seldom a reliable sign; but the type of breathing with gasping or groaning expiration and inspiratory retraction of the intercostal spaces may lead to the diagnosis. Signs of meningism, such as restless movements of the hands, stiffness of the neck, loss of consciousness, bulging of the fontanelles, and deep breathing, may cause meningitis or cerebral hæmorrhage to be suspected. Nobel holds that by keeping the babies and their mothers in small rooms and not exposed to the catarrhal infections so frequent in a large crowded ward, the hospital infant death-rate could be much lowered.

Adams and Berger⁴ discuss the differential diagnosis of lobar pneumonia and appendicitis in children. Of 145 cases of lobar pneumonia between the ages of 2 and 15, only 66 were sent to hospital with the diagnosis of pneumonia, and 25 were sent in with a diagnosis of appendicitis or were about to be operated on for that condition. This figure is much higher than in adults, as Abrahams in 558 adult cases found only 7 admitted as appendicitis; 7 patients were sent in with the diagnosis of cerebrospinal fever. A history of cough or pain in the chest points towards pneumonia; but the absence of respiratory symptoms does not rule out this disease. A history of vomiting, abdominal pain, and diarrhoea is of no value, as these occur as frequently in pneumonia as in abdominal conditions. The pneumonia patients always seem more ill, and present a characteristic general picture not seen in the abdominal patients. Pneumonia patients show much more systemic reaction, as seen by the pulse and temperature chart, than do the abdominal cases. Careful examination of the lungs will frequently reveal a small area suggesting early consolidation; but if it is located in the upper half of the chest or in patients who do not otherwise present the picture of pneumonia, it must be interpreted with caution. Abdominal tenderness and spasm are relatively frequent in pneumonia, but are different in type from those found in acute abdominal conditions. A high leucocyte count favours the diagnosis of pneumonia except when peritonitis or appendical abscess is suspected, in which case it is of no value in differentiation. In the presence of symptoms or signs of meningeal irritation, lobar pneumonia should be ruled out before lumbar puncture is done.

PROGNOSIS.—Capps and Coleman⁵ discuss the influence of *alcohol* on the prognosis of pneumonia. Rogers, of the New York Life Insurance Company, has shown that in several large companies the mortality runs 32 per cent higher in the group of moderate alcohol users than in abstainers. The figures of the Mid-western Mutual show that, if abstainers are rated at 100 per cent, the mortality of moderate or occasional users is 119 per cent; that of daily users of beer 133 per cent; and of daily users of spirits 166 per cent. The New England Mutual reports the startling comparison of 100 per cent in abstainers to 213 per cent in moderate users. The authors have studied 3422 cases of lobar pneumonia in males over the age of 18. The first group

contained the abstainers and those who used less than two glasses of beer a day, or who used spirits occasionally, and numbered 884. The second group included those who drank regularly two or more glasses of beer or one or two glasses of spirits, and numbered 1095. The third group included those who drank a large amount of beer or spirits, or who became intoxicated at times. They numbered 1443. The mortality in the first group was 22.45 per cent, in the second 34.4 per cent, and in the third 49.87 per cent. As excessive users were on the average a few years older than the moderate or light drinkers, tables were constructed to show the death-rate in decades in each group to eliminate the age factor. Thus in the decade 30 to 39 the mortality in the first group was 18.4 per cent, in the second 29.1 per cent, and in the third 42.5 per cent. There were 1095 cases in the moderate group and 1443 cases in the excessive group, giving a total of 2538 with a mortality of 1105. The mortality calculated on the basis of the figures obtained for the group of abstainers or light users would be 666. In other words, 439 deaths in the last two groups may be attributed to the use of alcohol in moderate or excessive quantities.

BACTERIOLOGY.—Cecil⁶ insists upon the importance of thinking of pneumonia in terms of the causative agent rather than in terms of anatomy or physiology, important as these latter aspects are. The character of the infectious agent in pneumonia is of more importance than the location or type of consolidation. He would have us speak less of lobar and bronchopneumonia and more of pneumococcus, streptococcus, or influenzal pneumonia. He points out that whilst infection with Type III pneumococcus may have a death-rate of 50 per cent, infection with Type IV shows a rate of only 10 to 15 per cent. *Streptococcus hæmolyticus* pneumonia has a death-rate of 40 to 60 per cent, whilst *Str. viridans* infection was under 10 per cent. He discusses the mode of infection in pneumonia, and holds, on the basis of recent experiments on monkeys, that it has a bronchiogenic rather than a hæmatogenous origin. The initial invasion takes place close to the hilum, and sections show pneumococci penetrating the walls of the large bronchi and invading the peribronchial and perivascular lymph spaces; the spread takes place by way of the perivascular, peribronchial, and septal tissues and lymphatics, the alveoli being infected by spread from the grosser framework of the lungs. With further advance of the process to the stage of hepatization, pneumococci pass out into the alveolar spaces. Experiments with *Str. hæmolyticus* show a similar mode of infection, but with the influenza bacillus the infection travels down the bronchial tree into the bronchioles and involves the alveoli by contiguity. Eastwood and Griffith,⁷ in a report issued by the Ministry of Health, discuss the bacteriology of pneumonia and the types and difference of serological reaction of pneumococci. Griffith finds in a series of 150 cases that the American Types I, II, and III occur in about the same proportion as in the United States; 45 of the cases were non-agglutinable with these three types, and he speaks of this collection as Group IV rather than Type IV, so that the latter word may be reserved entirely for agglutinable strains. Later investigations showed 12 serologically different types in this Group IV.

Eastwood⁷ discusses the problems of antigen and antibody as applied to the serological differences and the production of antisera. He considers that the 'mosaic pattern' theory of multiple antigenic components as an explanation of the nature of antibodies, and their relation to the antigens, has been pushed too far. Though of value in explaining the behaviour of other groups of bacteria showing some serological relationship, it is definitely an encumbrance when applied to the four groups of pneumococci. It may be that the common antigenic element probably present in all strains of pneumococci is masked in each group by the acquirement of some secondary factors which

prevent the characteristic response to the common antigenic element. On the question whether or not it will be possible to produce antipneumococcal serum for strains other than Group I, he writes: "I think the study of serological differences amongst pneumococci has not led to any final conclusions such as would justify the opinion that no serum will be therapeutically efficacious unless it contains an antibody corresponding to the antigen which is peculiar to the infecting strain".

Armstrong⁸ gives the results of serological classification of 200 strains collected during 1920-22. He shows that there is a seasonal variation. During the winters of 1920 and 1921 Type I appeared overwhelmingly, whilst Type II was more common in the early winter of 1921, but was later supplanted by Type I. The more severe forms of infection at all ages, such as empyema, meningitis, and peritonitis, tend to be due to type strains, whereas in the bronchopneumonia of children, bronchitis, and nasal catarrh, aberrant strains were found. He considers that the wide diversity of strains gives but little encouragement to specific serum therapy, and that the value of Type I serum in treatment is very questionable.

Moore⁹ finds the incidence of the types of pneumococci in Dublin not very different from those in the London area or the United States; but as regards mortality his results were very different: in Type I cases, 16.66 per cent mortality as against 25.2 in America; and no mortality in Type III cases, as against 56 per cent in America. The total Dublin mortality was 18.18 per cent, as against an American one of 26 per cent.

TREATMENT.—When we compare the results of the treatment of pneumonia during the last hundred years, we find the mortality with expectant treatment is much the same as with the drastic bleeding and tartar emetic treatment of the beginning of last century. Patterson,¹⁰ in a paper on the prognosis of pneumonia, gives some interesting figures of the mortality at various dates. In 1808-10 Rasori gives the mortality of 832 cases as 20.8 per cent. The British Medical Association collective investigation of 1883 showed in 1060 cases a mortality of 18 per cent. The Guy's Hospital figures for 1891-96 showed a mortality of 25.6 per cent; and Melbourne Hospital 1919-22, 21.3 per cent. He contrasts these with Dochez's 65 cases treated with serum with a mortality of 7.7 per cent, and his own results in 51 serum-treated patients with a mortality of 15.7 per cent.

Thomas,¹¹ writing on the treatment of Type I pneumonia with Serum, gives the statistics of cases occurring in St. Luke's Hospital, New York, and of those described in the literature since 1916. During four and a half years there were 306 cases of lobar pneumonia in adults. The incidence of the four types was found to vary from season to season, and the mortality-rate also varied with the time and place of its occurrence, so that it is difficult to appraise the result of specific treatment. Altogether Thomas deals with 610 cases, 177 of which were treated without serum. Many of these seem to have been mild cases, and serum was also omitted from the cases at St. Luke's Hospital admitted very late in the course of the disease. The death-rate amongst those who received no serum was 12.9 per cent, and amongst those treated with serum it was 11.3 per cent. Thomas is not very enthusiastic about serum treatment, but feels that certain patients were greatly benefited by its use. In 4 cases out of 50 it appeared to cut short the disease. A temporary benefit followed in 8, and the duration was apparently not affected in the remaining 38. Sometimes an immediate drop of temperature occurred after the injection of the serum, but a relapse followed and the case finished just as is usual in those patients who received no serum. A chill with rise of temperature was noted in 14, and a rise of temperature without chill in 6. The remaining

30 showed no thermal reaction, nor was there any demonstrable effect on the course of the disease. There was delayed resolution in 7 cases. As an additional test before giving serum, Thomas suggests the use of the protein of horse dandruff, for asthmatics may be sensitive to this and not to horse serum given intradermically. In such cases a severe reaction may follow intravenous injection of horse serum. Two cases of anaphylactic death following injections of antipneumococcal serum have been reported. In some cases it is impossible to desensitize the patient. Of the 50 patients, 36 suffered from serum sickness, which was quite severe in 12.

Locke¹² has treated 145 cases with serum, including 70 cases treated and controlled by a parallel series of 71 untreated cases. In general he did not find the striking effects on the general condition following serum which have been described by Cole. A study of the average duration of stay in hospital showed no advantage for the serum cases; resolution was not more rapid, and there was a somewhat greater number of complications in the serum-treated cases as compared with the controls; e.g., the incidence of empyema in the 145 serum cases was 10 per cent, and in the controls just under 6 per cent. The general mortality-rate in the treated was 17.2 per cent, and in the untreated 16.9 per cent—approximately the same; but in the 12 cases treated with serum within the first three days there were no deaths, whilst in 13 controls admitted within the first three days there were 4 deaths. He has collected the figures from military and civilian hospitals, and finds that in military hospitals the death-rate of 358 serum-treated cases was 9.5 per cent, which is practically the same as the general mortality for pneumonia in the army and navy. In civilian hospitals the mortality of serum-treated cases was 19.3 per cent, which is not significantly lower than the rate for untreated cases. But Cole's own figures for 195 cases at the Rockefeller Hospital were 9.2 per cent. If these are included in the 548 cases in civilian hospitals, the general mortality-rate would be 15.7 per cent for serum-treated cases. Locke considers that a final estimate of the value of Type I serum is at present impossible, but that further study of sufficient cases will furnish some proof of its value, confined, however, to cases in which it was administered within the first three days.

McGuire¹³ points out some of the chief reasons why favourable results are not always obtained with Type I serum. (1) The serum is not given early enough, for it has been repeatedly shown that the earlier the treatment is begun, the lower is the death-rate. (2) An attempt is made to treat the serious cases only; this is unreasonable, as a mild case may at any time take a turn for the worse. (3) Insufficient serum is often administered. No definite limit can be set. Even as much as 1000 c.c. may be necessary, but in the majority 200 to 300 c.c. is sufficient. It is best given every eight to twelve hours in doses of 100 c.c. Of course, if the skin test shows that the patient is sensitive, he must be desensitized. (4) The type of pneumococcus is not determined in every case; this operation requires about twelve hours; if no sputum is obtainable, McGuire punctures the lung. (5) Some physicians use so-called 'polyvalent serum', and not specific Type I serum. McGuire states that no serum but that for Type I has so far proved its worth. The most striking results of the treatment in McGuire's 35 cases was that on the average the febrile period of the disease lasted for sixty-six hours only.

Hunttoon¹⁴ has prepared a **Serum-free Solution of Pneumococcus Antibody**. He utilizes the principle that antibodies in serum will combine with the bacteria with which the animals are immunized. By heating the sensitized bacteria in an alkaline solution the antibody is split off, and the final preparation is a serum-free aqueous solution of specific antibodies. It contains protective substances against pneumococcus Types I, II, and III, and a small quantity

of pneumococcus protein which may conceivably act as a vaccine and produce some active immunity. Cecil and Larsen¹⁵ have tested this solution on a large number of cases. In 424 treated cases the death-rate was 21·4 per cent. A control series of 410 cases in the same institution showed a death-rate of 28·3 per cent. The most striking results were obtained with Type I pneumonia, 156 treated cases giving a death-rate of 13·3 per cent, while a control series of 162 cases gave 22·2 per cent. A definite but less marked effect was observed with Types II and IV, but no effect on the death-rate was seen with Type III. In the treated cases 28·8 per cent recovered on or before the fifth day. In the control series only 7·9 per cent recovered on or before the fifth day. There were 44 severe complications in the 424 treated cases, and 54 in the 410 controls.

Wynn¹⁶ insists upon the importance of the early treatment of pneumonia, and asks that it should be regarded as an acute medical emergency demanding prompt action in the same way that a perforated duodenal ulcer and acute appendicitis are regarded as acute surgical emergencies. Diagnosis should be made without waiting for consolidation. The early symptoms are so striking that diagnosis should be possible within a few hours. He uses a Vaccine of mixed strains of pneumococci made from young primary cultures for lobar pneumonia, and for influenzal pneumonia adds equal numbers of streptococci and influenza bacilli. He gives 100 million pneumococci for lobar pneumonia in an adult, and 100 million of each organism for influenzal pneumonia; for a child of twelve to fourteen, 40 to 50 million, and to a child of two or three, 10 to 20 million. When such a dose is used during the first day of the disease, the temperature falls to normal on the following day in the majority of cases, and no further treatment is required. With each day's delay such rapid deferescence becomes less likely, and the dose may have to be repeated every twenty-four hours. When injection is delayed until the fourth day or later, little can be expected of specific therapy. Toxins will then have already damaged heart and nerve-cells. The object of vaccine treatment is to prevent this damage. Of cases injected during the first day the temperature became normal in twenty-four hours in 83 per cent. and within forty-eight hours in 100 per cent. Of second day cases, 37 per cent had a normal temperature in twenty-four hours, 71 per cent in forty-eight hours, and 93 per cent in three days; but of those injected on the third day only 20 per cent were normal in twenty-four hours, 60 per cent within forty-eight hours, and 73 per cent within three days. In a series of 100 cases injected for the first time at various stages the following were the results. On the first day, 10 cases with one death—a woman, age 29, who was pregnant at full term, and labour began on the second day. She was also an asthmatic. This is the only death among a large number injected on the first day. On the second day, 17 cases, no deaths. On the third day, 22 cases, no deaths. On the fourth day, 16 cases, with 3 deaths (one a baby a year old, and the other an adynamic case, age 65). On the fifth day, 9 cases with 3 deaths. On the sixth day, 7 cases with 2 deaths. On the seventh day, 5 cases with 1 death. On the eighth and ninth days, 5 cases with no death. There was an uncertain date of onset in 9 cases, but they were injected late and 3 died. Out of 49 cases injected within three days, only one died, and this was complicated by labour and asthma; the remaining 12 deaths occurred in patients injected on the fourth day or later. The results in 107 hospital cases with influenzal pneumonia are given on the following page.

Analysis of the results emphasizes the importance of early treatment. He points out that the chief obstacle to vaccine therapy is the fear of the negative phase. But a case is related in which a doctor by mistake injected a patient with very severe influenzal pneumonia with 1000 million pneumococci, 500 million influenza bacilli, and 100 million streptococci. There was no sign

of a negative phase, and the temperature became normal in less than twenty-four hours.

VACCINE THERAPY IN 107 CASES OF INFLUENZAL PNEUMONIA.

Day of First Injection	Cases	Recovered	Died	Temperature normal in—	
				24 hours	48 hours
				Per cent	Per cent
1st ..	28	28	0	71.4	85.7
2nd ..	23	22	1	47.8	56.5
3rd ..	22	20	2	50.0	72.7
4th ..	20	15	5	30.0	40.0
5th ..	14	12	2	35.7	63.5
Total ..	107	97	10	50.0	65.0

Protein Therapy.—Attempts have been made to abort pneumonia by the injection of **Foreign Proteins** such as milk, typhoid, or gonococcic vaccines, phylacogens, peptone, etc., either intramuscularly or intravenously. Small series of cases have been reported, and they show that the immediate thermal reaction is often followed by general improvement and signs of beginning resolution. But the thermal reaction was often severe and even violent, and it does not seem justifiable to use these methods when better results can be obtained without these disadvantages. The specific therapy of pneumonia is making headway, but the decision between passive immunization with serum and active immunization with vaccine cannot yet be made. Serum therapy has the disadvantage that it is highly specific, and so far only an effective serum against Type I infection has been prepared. Unfortunately two-thirds of the cases and two-thirds of the deaths are caused by infection with the other types. Before serum can be used the type of pneumococcus must be determined, and this causes a delay from twelve to twenty-four hours and access to a well-equipped laboratory. The serum must be given intravenously in large amounts and at frequent intervals. The injection of this large amount of foreign protein is frequently followed by severe constitutional disturbances. To avoid the danger of anaphylaxis it is further necessary to do an intradermal test. With both active and passive immunization, treatment should be begun within the first three days and grave symptoms anticipated. Active immunization when given early appears to be quite safe and free from the disadvantages associated with serum, and its results appear to be more decisive, but so far it has not been tested on a sufficiently large scale.

Drug Treatment.—No new drug treatment of importance has been reported, and there has been some destructive criticism of drugs in familiar use. Herrick¹⁷ employs small doses of **Digitalis** as a routine, but is not convinced that this is useful except in patients with chronic myocardial weakness or auricular fibrillation. Wynn points out that it is used by many to retard the pulse, but that the heart does not fail because of its rapidity but because of its intoxication. Heart failure does not stand alone, but is part of a general intoxication, and the circulatory phenomena are as much due to the action of toxins upon the medullary centres as on the heart muscle. With such a condition digitalis must be useless. The heart can best be helped by giving it food and oxygen. The best food for the heart is **Sugar**, and intravenous injections of 10 per cent **Glucose** are perhaps the most valuable of all remedies when failure has commenced. Herrick finds that camphor and ether, whisky, and camphor in oil are of little use. With Lieb he finds that these and similar substances apparently act by irritation of sensory nerves and not by direct action on the

circulation. Heathcote¹⁸ has studied the effect of Camphor, Menthol, and Thymol on the circulation, and finds the action on the perfused isolated heart is purely depressive; both rate and amplitude of beat were reduced, probably from direct action on the cardiac muscle.

Broughton¹⁹ gives 1 c.c. of Pituitary Gland intramuscularly to keep up blood-pressure. He relates the case of a man, age 50, with double pneumonia, who received 100 c.c. in the period of ten days. In thirty minutes the blood-pressure was raised 16 mm. and the diastolic 8 mm. In one hour the systolic pressure was back to the former level, but the diastolic pressure remained 4 mm. higher.

Bleeding has several advocates. Bingel²⁰ gives horse serum intramuscularly, and two hours later withdraws 600 c.c. blood from a vein, horse serum being again given a few hours later. He describes good results in twenty cases. Eckstein and Noeggerath²¹ advocate Arterial Section instead of venesection, especially in young children.

Wynn has used Artificial Pneumothorax in a few cases of severe pleurisy with pneumonia, the pleural surfaces being separated by a small quantity of oxygen. Immediate relief to the pain and restlessness was given.

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PNEUMO-VENTRICULOGRAPHY. (See also BRAIN, TUMOURS OF.)

Sir James Purves-Stewart, K.C.M.G., C.B., F.R.C.P.

Ordinary radiograms of the skull have hitherto proved of diagnostic value only in a limited class of cases, chiefly in certain pituitary tumours, in which the sella turcica is sometimes found to be abnormally deepened or otherwise deformed. Direct X-ray evidence of a brain tumour is only to be expected when it has either undergone calcification or when it has grown into one of the accessory air sinuses, e.g., the sphenoidal sinus. In this connection we have to remember that even in normal individuals calcification may sometimes be visible by the X rays—e.g., in the pineal body, choroid plexuses, Pacchionian bodies, and falx cerebri. We have also to bear in mind the important information gained by radiography in traumatic cranial lesions, especially in the localization of foreign bodies, the identification of fractures and in-driven fragments of bone, and so on.

Supplementary to ordinary radiograms, however, Dandy¹ has devised a method of Pneumo-ventriculography whereby air is introduced into the cerebral ventricles, after withdrawing a corresponding volume of cerebrospinal fluid, say 80 to 100 c.c. This is done, not continuously, but in small amounts of 5 to 10 c.c. at a time. The procedure is carried out either through a small trephine-hole into the lateral ventricle, or, more simply, through a thecal puncture needle. Once the air has been introduced, it rises to the highest parts of the brain. Then, by placing the patient's head in various successive positions, the air is made to pass into the various ventricles in turn.

In a normal individual, in whom all the foramina of communication between the various parts of the subarachnoid space and intraventricular system are unobstructed, the air fills not only the cerebral ventricles, but also the fissures and sulci of the cerebral cortex. A fronto-occipital radiogram, with the head erect, will show the two lateral ventricles with the septum lucidum between

them, forming a butterfly-like pattern. In lateral views of the skull, the lateral ventricles are seen in their entire extent, including the anterior and posterior cornua. In lateral views also the fourth ventricle stands out somewhat like a starfish.

The chief pathological processes in which pneumo-ventriculography has proved useful are *hydrocephalus* and certain *brain tumours*. Dilatation of one or both lateral ventricles is easily recognized in fronto-occipital or occipito-frontal pneumo-radiograms. Hæmorrhages and softenings may produce unequal filling of the two lateral ventricles, or displacement to one or other side. In brain tumours the usual thing is to find compression of the lateral ventricle on the side of the tumour and dilatation of that on the opposite side: the tumour therefore lies on the side of the smaller lateral ventricle. In every pneumo-radiogram the position of the head must be accurately recorded, for in fronto-occipital or occipito-frontal pictures the air-content of the lateral ventricle varies according as the anterior, middle, or posterior part is dilated.

In tumours of the posterior fossa, the tendency of a pneumo-radiogram is to show deficiency or absence of air in the lateral and third ventricles whilst the cerebral sulci are well filled. On the other hand, in meningeal basal adhesions without obstruction of the iter, the ventricles are well filled whilst the sulci and basal cisterns are not filled. Alwens and Hirsch² record a case of bilateral intraventricular hæmorrhage in which no air reached the ventricles, whereas the cerebral sulci were strongly outlined by air. If meningeal adhesions are present in the region of the medulla, they may prevent air from entering the cisterna magna or anywhere else within the cranium. In such a case the air will be held up around the medulla and cervical region of the spinal cord.

Caution must be exercised in the interpretation of pneumo-ventriculograms. We have to bear in mind that every plane of the skull and its contents is projected on to the one radiographic plate. Moreover, as the position of the patient's head changes, so does the position of the air float to the highest level, and thus may produce varying pictures. Thus, with the patient's head lying backwards in the supine posture, the air accumulates in the anterior cornua, and we must be careful to note which side of the head is which. It is therefore wise to supplement such a picture by another with the patient lying in the prone position, with his forehead underneath and the posterior cornua uppermost, so as to obtain a shadow of them as well. Dilatation of the whole lateral ventricle is best seen in side-to-side radiograms with the head vertical.

Air injections of this sort are best carried out in a patient who has been prepared beforehand by having an empty stomach, so as to avoid the risk of vomiting, also by giving a dose of 10 or 15 gr. of veronal several hours beforehand. Air should be introduced in small quantities of 5 to 10 c.c. at a time, up to a total of 80 or 100 c.c. The patient should be in the sitting position. During the process, if we auscultate the skull we can hear the air bubbling up into its interior. Air thus introduced is soon absorbed, and after six to ten hours is no longer visible in radiograms. A slight rise of temperature of 1° or 2° commonly follows the operation, possibly due to irritation of the ventricular walls. Sometimes the patient complains of headache and even of vomiting. Changes in pulse and respiration are uncommon, but a few cases of collapse, especially in alcoholic patients, have been recorded.

From what we have said, it will be seen that pneumo-radiography is not a measure to be undertaken lightly or indiscriminately. It should be reserved for selected cases and carried out by skilled hands, after careful and systematic neurological observation of the patient.

THERAPEUTIC APPLICATION.—Injection of air into the brain may be used for therapeutic purposes. According to Alwens the most suitable cases are those

with increased pressure of cerebrospinal fluid, meningitides of various kinds, chronic hydrocephalus, and uræmic conditions.

It is a useful plan in ordinary lumbar puncture, when carried out for diagnostic purposes, to replace the withdrawn fluid by a corresponding volume of air. In this way perhaps the dangers of lumbar puncture in tumours of the posterior fossa may be avoided.

REFERENCES.—¹*Surg. Gynecol. and Obst.* 1920, April and Sept.; ²*Münch. med. Woch.* 1923, Jan. 12, 41.

POISONING BY COAL GAS. (See COAL-GAS POISONING.)

POMPHOLYX.

E. Graham Little, M.D., F.R.C.P.

Greenbaum,¹ taking up Darier's statement that he had found parasitic mycelia in 80 per cent of his cases presenting the clinical aspect of pompholyx, has conducted some researches towards testing this causation.

Inoculation Tests.—Carefully sterilized vesicles with clear contents were punctured with a pipette, and inoculation experiments from this material conducted in five volunteers. They were kept under observation for three weeks, and none of them developed the disease. Auto-inoculation tests were also performed. Sterilized vesicles were punctured, and the material these contained rubbed into superficially scarified areas on the patient's skin. These tests, after three weeks' observation, were negative.

Complement-fixation Tests (using antigens derived from cultures of *Trichophyton* and *Achorion*).—These also proved negative.

As a result of these experiments, the author concludes that well-defined pompholyx is a clinical entity, and that ringworm as a cause can be excluded. Poorly-defined cases of pompholyx or pompholyx-like eruptions may have a mycotic origin.

REFERENCE.—¹*Arch. of Dermatol. and Syph.* 1922, Dec., 757.

POTT'S DISEASE.

E. W. Hey Groves, M.S., F.R.C.S.

Operative Fixation.—The treatment of spinal caries continues to occupy much attention. More and more is there a consensus of opinion that the operative fixation of the tuberculous spine is only a part of the general conservative treatment of the disease, and that it is only suitable for specially selected cases, these being generally adults in whom the disease is of limited extent.

Girdlestone¹ gives a careful review of the mechanical conditions of the spine as bearing upon this subject, and then, after quoting Hibbs' recently published results, he goes on to describe those of the Shropshire and Oxfordshire Orthopaedic Hospitals in 100 consecutive operative cases.

Hibbs' operation consists in first of all separating all the soft tissues from the spinous processes and laminae of the affected segment of the spine, including the periosteum and the ligamenta subflava (i.e., the ligaments connecting the edges of adjacent laminae). When this has been done so as to separate a continuous periosteal and ligamentous tube from the spine as far out as the intervertebral articulations, portions of the spinous processes and laminae are chipped off, or the spines are actually fractured at their bases, so that one spinous tip shall lie against the fractured base of the spine below. All are agreed that the operation is one difficult of execution, and that, even when done perfectly, a long time must elapse before strong bony fusion can occur in the vertebral column. In his recent series of 210 cases, Hibbs states that every patient who would consent to the operation, and whose general condition warranted the anaesthetic, was treated by this method. The contra-indication

was held to be the existence of a discharging sinus in or near the field of operation. He had no operative deaths, 157 cures (75 per cent), 22 doubtful results, and 31 cases who died, subsequently to the recovery from the operation, of tuberculosis (13 miliary, 5 meningitis, 4 phthisis, 3 amyloid). In regard to the mechanical efficiency of the operation, Hibbs claims that in only 4 out of 210 cases did bony fusion of the vertebral column fail to occur.

Girdlestone considers that the Albee operation (placing a graft from the patient's tibia into the split spinous processes) is easier to perform than that of Hibbs, and that it produces a more rapid fusion. In his series of 100 cases there were 2 operative deaths, and 6 who died at periods of one to four years after the operation from various causes, mostly of a tuberculous nature. Of the remainder, 78 made a good recovery, or were doing well at the time of the report. The results of the last 50 cases had been better than those of the first 50; there had been no operative mortality, and a higher proportion of recoveries, in the second half of the series. This improvement in results was due to the better selection of cases, chiefly in regard to age-incidence. Thus, in the first 50 there were 36 children, whilst in the second 50 there were only 16. Better results are also due to more prolonged splinting in the open air, and to more careful after-care.

Great importance is attached to a plaster-of-Paris turning case. This is made and fitted before the operation. The patient is laid on an abduction frame, and a plaster case is fitted on the front of the body from the chin to the ankles. During the operation, and after it whenever the patient has to be turned for dressing or heliotherapy, the case is laid on to his body, fixed by straps, the patient turned over, and the posterior frame removed (*Plate XXXIX*). After the operation the patient is kept for from three to six months on the frame, and for about a year longer he is provided with a spinal support.

Wheeler,² from an experience of 27 cases, writes in strong support of the value of bone-grafting as a part of the conservative treatment of Pott's disease. He has abandoned the method as unnecessary in children. One of the chief technical difficulties in laying the graft from the tibia into its spinal bed has been to adapt the straight piece of tibia to fit the angulated portion of the spine. Albee himself has employed two methods to overcome this difficulty. In one a graft is cut as an obtusely angulated flat piece from the internal surface of the tibia. But this is evidently a method of very limited application, because the tibia is not wide enough to allow of the necessary shaping. The other method is to make cuts through one side of the graft about half-way through its thickness and then bend it into shape. Wheeler illustrates an interesting case when the graft was shaped by means of a greenstick fracture. Good recovery took place, but death occurred six months later from another disease, and the specimen shows complete fusion of the spinous processes with the fractured graft, which has itself firmly united (*Plate XL*). He considers that the existence of closed tuberculous abscesses is no contra-indication for the operation, but, on the contrary, that after operative fixation the abscesses usually disappear.

Gray,³ who has done the graft operation for spinal cases 28 times, with one fatal result, is also strongly impressed with its advantages. He makes several modifications in the technique. He always infiltrates the areas of operation both in the back and leg with $\frac{1}{2}$ per cent novocain with adrenalin. Frequently no general anæsthetic is used, but even if it is, the local injection is of much value in diminishing shock and preventing hæmorrhage. Instead of splitting the spinous processes, he clears both sides of the spine, together with the laminae, and places a graft on each side of the spinous processes thus prepared.

PLATE XXXIX.

POTT'S DISEASE:
PLASTER-OF-PARIS TURNING CASE

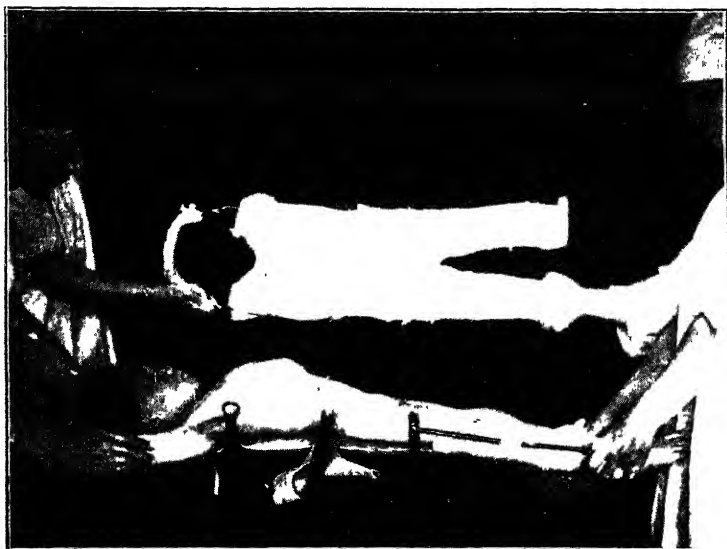


Fig. A.—Child on frame. Turning case being applied.

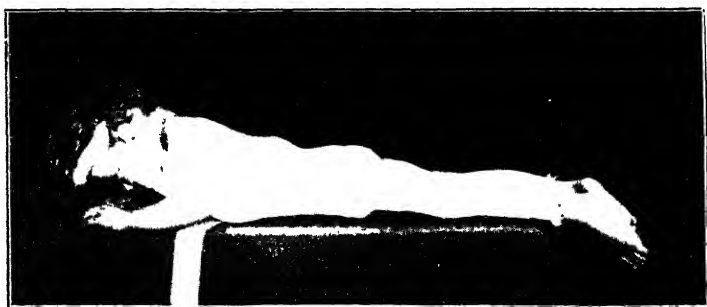


Fig. B.—Child lying in turning case as for operation.

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PLATE XL.

POTT'S DISEASE—*continued*

GRAFT PREPARED BY GREENSTICK FRACTURE



Fig. A.—Specimen from patient who died six months after operation. The graft was fractured to take the curve. There is strong bony union between the graft and the spinal segment. Firm fixation resulted.



Fig. B.—X-ray photograph showing firm incorporation of the graft with the vertebrae six months after operation.

By kind permission of 'The Practitioner'

No method of fixation is used other than the suture of the muscles and aponeurosis over the graft. The tibial graft is cut from the full length of the antero-internal aspect of the bone, using a parallel series of drill holes, which are joined by an osteotome instead of a saw. The graft is cut into two halves to provide for the double graft embracing the two sides of the spinous processes.

REFERENCES.—¹*Brit. Jour. Surg.* 1923, Jan., 372; ²*Practitioner*, 1922, Nov., 341; ³*Brit. Med. Jour.* 1922, ii, 73.

PREGNANCY, DISORDERS OF. (See also TUBERCULOSIS.)

W. E. Fothergill, M.D.

Sepsis in Pregnancy.—J. E. Talbot^{1, 2, 3} has written much interesting material on the effects of chronic sepsis in pregnancy, which he regards as the leading factor in the causation of the toxæmias of pregnancy, with or without convulsions, and also of some other conditions—namely, ante-partum hæmorrhage from placenta ablata, habitual abortion, macerated fœtus, hydramnios, deformities of the child, and premature labour. The placental infarct, he says, is the lesion most constantly found in association with the conditions in question; and if the so-called infarct can be proved to be infective in origin the whole problem can be explained. Talbot refers to the work of Young, of Edinburgh, La Vake, of Minnesota, and de Lee, but approaches the subject himself from the clinical standpoint. He observed that colds in the head were often associated with miscarriage and threatened miscarriage, and in 1920 he published two cases to show that the damage done in threatened miscarriage was recorded on the edge of the placenta in the form of a white infarct; the position of the infarct being so related to the insertion of the cord as to show that the infarct must have originated at the time when the bleeding occurred. He does not say that every bleeding (threatened abortion) is preceded by demonstrable acute infection in the head, nor that every acute infection during pregnancy is recorded on the placenta in the form of infarcts. But in his experience bleeding not associated with acute infection has always been associated with chronic sepsis (septic teeth or tonsils generally). The primary lesion which produces the infarct is in the maternal blood-vessels of the placental site, and is infective in origin according to some laboratory evidence; in particular, the case of Cornell and Earle, who found multiple discrete hæmorrhagic lesions of infective origin in the decidua basalis in association with threatened miscarriage immediately preceded by infection in the throat. Toxæmia of pregnancy is constantly associated with chronic sepsis, and there is much evidence to show that it is not the result of infarct formation or of infection of the placental site except in so far as such infection may act as a new area of sepsis. Talbot considers that many obstetrical tragedies are preventable by timely removal of areas of chronic sepsis in connection with dead teeth and in the tonsils. But he says that the removal of these foci during pregnancy has very definite limitations, as harm may often be done by interference with such foci, especially before the fourth and after the seventh month of pregnancy.

Heart Disease in Pregnancy.—A. Leyland Robinson⁴ makes an interesting contribution to this subject. Sir J. Mackenzie thinks that the views of some modern obstetricians are less advanced than those of Angus Macdonald published in 1878, and that obstetric physicians "have not taken the trouble to understand the elements of cardiology". Robinson has therefore been studying Macdonald's book and the elements of cardiology, as well as 39 examples of pregnancy and labour in heart cases recently treated in the Liverpool Maternity. He finds that Macdonald's conclusions are in the main surprisingly applicable to the present time, but some of his opinions must be

modified in the light of the modern interpretation of murmurs, estimation of heart efficiency, and the myogenic theory of heart conductivity. The writer discusses the significance of murmurs, the estimation of cardiac efficiency, the signs of heart failure, and the myogenic theory, and considers the various ways in which pregnancy and labour affect the heart and circulation.

In his 39 cases there were 26 of mitral stenosis, 5 of whom died, a sixth fatal case showing a combination of this lesion with aortic regurgitation. There were 6 cases of mitral regurgitation, 2 of aortic regurgitation, and 6 of functional heart disease. Mitral stenosis and aortic regurgitation form the most important group of cases, as was stated by Macdonald long ago. The writer points out the value of proper treatment during pregnancy. Of 17 severe cases of mitral stenosis, 12 received satisfactory treatment, and only one of the twelve died. The other 5 were untreated, and they all died. Methods of avoiding and detecting heart failure, the maintenance of the cardiac reserve, and the improvement of the cardiac muscle are the chief aims of the physician. The main duty of the obstetrician lies in the supervision of labour and the choice of the best method of delivery. The termination of pregnancy and sterilization are questions which demand special consideration from both. **Digitalis** and **Strophanthin** are sheet anchors in auricular fibrillation, and may be given intravenously in urgent cases—0.5 mgrm. strophanthin in 3 c.c. of saline, or the tincture pushed in full doses until the ventricular beat is slowed to 70 to 90 per minute. Apparently there is no evidence that strychnine, camphor, or alcohol is of any real value in heart failure.

With aortic disease, the first sign of heart failure justifies the induction of **Abortion**. In mitral stenosis the uterus should be emptied if there is progressive decompensation in spite of treatment with digitalis.

In later months, with a viable child and good cardiac condition, **Premature Labour** is a sound precaution for any type of heart disease. But for heart failure in advanced pregnancy induction of labour is generally bad. It is better to attempt to restore compensation first, for in the presence of serious heart failure induction is almost sure to kill the patient. The spontaneous onset of labour is an unfortunate accident that cannot be prevented.

Some damaged hearts will stand the strain of delivery at term unaided, but this can often be reduced by the use of forceps with advantage. Narcotics should be given to reduce the voluntary efforts of the patient, which are always harmful and sometimes dangerous. It is probable that Cæsarean section will give better results in grave cases. It involves some shock; but so do all methods of delivery; and it is specially indicated in primigravida, when there is reason to suspect any delay or difficulty in delivery, and when, near term, the heart has just responded to treatment and its reserve is poor.

Although the immediate recovery after labour may be good, much damage may be done. Mackenzie mentions six cases of auricular fibrillation of whom all but one died within two years of successful labours. But many heart lesions are progressive quite apart from pregnancy and labour. Repeated pregnancies should therefore be forbidden to women with defective hearts, and surgical sterilization may be advised in certain selected cases. [This paper should be read *in extenso* by those interested; and, with its contents, the point insisted on by the late Berry Hart should be remembered. This was the special danger incurred during the third stage of labour, and just after it. With the emptying and retraction of the uterus the blood squeezed from the organ appears to overload the venous circulation and to over-distend and paralyse the right side of the heart. Whether this theory be correct or not, it is known that many of these women die just at the end of the third

stage. It has been suggested that bleeding from the placental site during the third stage should be favoured in these cases. This can be done by manual partial separation of the placenta.—W. E. F.]

REFERENCES.—¹*Boston Med. and Surg. Jour.* 1922, Aug. 31, 315; ²*Surg. Gynecol. and Obst.* 1922, July, 42; ³*Ibid.* Aug., 187; ⁴*Jour. Obst. and Gynaecol. Brit. Emp.* 1923, No. 2, 172.

PREGNANCY, DURATION OF. (See MEDICO-LEGAL POINTS.)

PRE-OPERATIVE AND POST-OPERATIVE TREATMENT.

Sir W. I. de C. Wheeler, F.R.C.S.I.

The post-operative management of cases has received close attention for some years past. The subject is allied to the immediate pre-operative preparation. If careful consideration is given to a patient for two days before operation and for five days after operation, the results of surgical treatment are strikingly improved. Judgement, gentleness of manipulation, and team work are the keynotes to successful operation.

For two days before operation, it is an advantage to administer alkalis until the urine is alkaline. This simple procedure lessens post-operative discomfort and distention, and has some influence in preventing acid intoxication associated with shock. Fluid should be given in large quantities, either by mouth or rectum, both before and after operation. Strong laxatives producing purgation and dehydration are contra-indicated before operations. Unless special reasons exist, the patient's movements should not be restricted in bed after operation. If patients sit up in a chair, instead of being confined to bed, three or four days after operation, they sleep better, muscular weakness is prevented, and convalescence is shortened. The mere fact of lying in bed produces, in itself, an illness, and the healing of a wound is stimulated and hastened by early movements. It remains for someone to enunciate a law analogous to Wolff's law, but which operates in the case of the soft tissues instead of the bones. These matters have been dealt with in detail in the *MEDICAL ANNUAL*, 1923, p. 434.

A leading article in the *British Medical Journal*¹ deals with the question of giving *purgatives and enemas before operations*. It quotes Alison, of Newcastle-on-Tyne, as follows:—

“The surgery of the present day, which I greatly admire, has two great and glorious achievements to its credit—anæsthesia and asepsis. But it has still certain reproaches, one of which is the ‘preparation’ of patients for operation.

“How many of the patients who die on the operating table die, not from the operation, nor from the anæsthetic, but from the ‘preparation’? A nervous patient, afraid of the unknown (and most of us are afraid), is given a barbaric dose of unnecessary aperient the night before the operation, is kept awake the most of the night, and rendered unfit for the morrow by sleeplessness, griping pain, and getting out of bed. Instead, therefore, of refreshing sleep, the patient is worried physically and mentally most of the night, and the last chance of repose is banished by an enema in the early morning. Anything less scientific can hardly be imagined, as the patient goes on to the table ‘prepared’ rather for collapse than for operation. If this surgical fetish is in any way desirable, might I suggest that it be done two or three days before the operation? Before the operation, in my opinion, it would be wiser and kinder to give 2½ gr. (each) of veronal and phenacetin, with ½ gr. of caffeine at 7 o'clock the previous evening, and/or a grain of opium at 9 p.m.; personally I would rather have both than the castor oil and the enema.

"Happy, indeed, is the emergency case, even with a ruptured gastric or duodenal ulcer (in whom no 'preparation' is possible) in comparison with the 'prepared' patient, and it would be both interesting and instructive if some of our hospital surgeons would give their impressions and statistics on these two classes of cases."

The Journal collects some opinions expressed upon this subject. It says the suggestion that purging before an operation is harmful rather than beneficial to the patient is not new. So long ago as 1861 Oliver Wendell Holmes said: "If it were known that a prize-fighter were to have a drastic purgative administered two or three days before a contest . . . no one will question that it would affect the betting on his side unfavourably". The custom of purging has, however, a long history to support it, dating back beyond humoral pathology to the dawn of civilization. Purgatives were given to healthy persons about to undergo any ordeal—those starting on a journey were purged; those about to be bled; those about to be tortured for the extortion of confessions. As early as 1776 Cullen questioned the value of "these pretended preparatory courses of medicine. . . . Other mischievous effects have sometimes appeared". G. W. Crile warns against starving a patient too long and purging too severely before operation, because it interferes with the normal tone of the intestine. W. J. Mayo has pointed out that the difficulties and dangers of using clamps in gastro-intestinal operations are increased by purgation. W. C. Alvarez is of the opinion that the purgation of patients before operation is not justifiable. E. Wyllys Andrews is strongly of opinion that a simple enema the night before is ample preparation for most surgical procedures. Sir Berkeley Moynihan says: "Flatulence is a troublesome complication, not only of abdominal, but of other operations also. Its cause is uncertain. My own view is that it chiefly results from the starvation and purgation which are almost universally considered a necessary part of the ritual of deliberate operations. Both are certainly undesirable and are possibly harmful. . . . An enema generally clears the colon quite as much as is necessary. Sir William de Courcy Wheeler said recently, regarding his own practice, that no laxatives to cause purging were ever given to patients before operation, and no enema was given on the morning of operation."

Post-operative Complications.—Shier² says that success in surgery depends on three things: (a) Surgical diagnosis; (b) Surgical technique; and (c) Post-operative care. It is much easier to prevent post-operative complications than it is to cure them. He advocates the giving of morphia for the first twenty-four hours, and, in uncomplicated cases, it will not be required afterwards. Atropine relieves the pain of pyloric spasm. He recommends digitalis per rectum to prevent distention in abdominal cases; he is not quite sure in what way this acts; there may be a direct action on the unstriated muscles, an action on the vagus nerve, or it may put general tone into the cardiovascular tree. The last seems as likely as any, since shock, with its consequent venous engorgement, must be one of the underlying factors in inducing distention. To the continuous saline solution, given by the Murphy drip method, 6 oz. of glucose (10 per cent), 1½ drachms of concentrated tincture of digitalis (B. & W.), and 80 gr. of sodium bromide are added.

Shier discusses *post-operative vomiting*, and rightly insists on gastric lavage when it is persistent. He points out the necessity for examining the urine for acetone, and, if present, giving plenty of glucose, 10 per cent solution, with sodii bicarb. 5 per cent, per rectum, by the drip method.

Shier favours the idea that *post-operative pneumonia* is due to multiple emboli. [The reviewer has urged attention to the mechanical factor. After certain abdominal operations pulmonary complications may arise, whether the

anæsthetic is administered by the rectum or by any other method, and often follow the employment of local anæsthetics alone. In the acute upper abdomen the diaphragm becomes rigid by the same mechanism which causes rigidity of the recti muscles. There is a general reflex splinting of the whole area involved; and in consequence the diaphragm cannot descend. This fixity of the diaphragm produces œdema of one or both lungs, and fine pulmonary crepitations can be heard at the base in most cases. These crepitations must not be mistaken for commencing pneumonia with reflex abdominal rigidity and pain. One of the last cases under my care was one of the Ministers of the Irish Government, who was wounded in the back by a bullet. The spinal column was hit, and the bullet was deflected so that it came to lie above the right kidney in the region of the diaphragm. After the operation for extraction, fine crepitations could be heard at the base of both lungs; there was expectoration of rusty sputum, the temperature rose, and for a few days the condition of the patient gave rise to anxiety, but with the healing of the wound and gradual relaxation of the muscles the pulmonary complications, as is usual, disappeared. I would, therefore, suggest that crepitations at the base of the lungs may be a sign in favour of an acute upper abdomen and not against.—W. I. de C. W.]

When *phlebitis* occurs (most commonly after pelvic surgery), the leg should be placed in a Thomas splint which swings free above the mattress. Hot lead and opium compresses should be applied to the vein; this removes the tenderness and pain more speedily than any other local application.

There is no specific for *hiccup*. Gastric lavage is one of the first methods to adopt; aromatic spirits of ammonia or chlorodyne, iced champagne, and butter-milk, have all been recommended.

Banham³ describes a *self-retaining, easily-removable drainage tube*. A long black linen thread is drawn through the lumen of the tube, passed through a needle, and stitched through the side of the tube close to its end. A stitch is then taken in the depth, fastening this end of the tube to the tissues close to the point where drainage is to be expected (Fig. 78). The thread is then brought out of the wound and tied over the exposed end of the tube. In this way the pads can be easily removed without dislodging the tube. When it is desired to remove the tube, the thread outside the tube is cut. To preserve asepsis, this is done just beneath the skin after applying a drop of iodine. The tube is then easily withdrawn, the thread being pulled from the tissues without causing any injury or pain. He has found this tube very practical because of the painlessness of its removal. It can be used wherever retention of drainage tubes in their proper place is difficult. In cholecystostomy he sutures the tube to the incision in the gall-bladder, tightening the gall-bladder about it with a purse-string which does not perforate the tube. In cholecystectomy, as

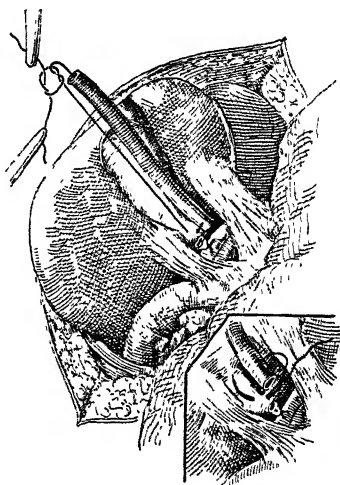


Fig. 78.—Banham's method of drainage, showing the tube fastened close to stump of cystic duct after cholecystectomy. The suture, passed through the tube, is fastened close to the stump of the cystic duct as shown in the inset, then tied over the end of the tube, outside the abdomen, without bending the tube. (Redrawn from 'Surgery, Gynecology, and Obstetrics'.)

illustrated above, the tube is fastened close to the stump of the cystic duct. In prostatectomy the tube is sutured to the incision in the bladder, tightening the vesical walls around the tube by a few sutures. In breast amputations the tube is fastened to the stump of the pectoralis muscles.

REFERENCES.—¹*Brit. Med. Jour.* 1923, i, 476; ²*Canad. Med. Assoc. Jour.* 1922, Nov., 793; ³*Surg. Gynecol. and Obst.* 1922, July, 102.

PROLAPSE, GENITAL. (*See* GENITAL PROLAPSE.)

PROSTATE, SURGERY OF.

Sir John Thomson-Walker, F.R.C.S.

Mario Negro¹ has made a series of investigations on the relation of eosinophilia to simple hypertrophy or carcinoma of the prostate. He takes as his basis the 'formule leucocytaire' adopted by French hæmatologists, who regard the normal percentage of eosinophils as varying from 0.5 to 2 per cent, and he arrives at the following conclusions: After excluding all other causes which may give rise to a modification of the eosinophil count, such as parasitic diseases, shocks, and industrial poisonings—as for example, in celluloid workers—he finds in simple hypertrophy of the prostate an increase of eosinophils in 75 per cent of cases, whereas the neutrophil polymorph leucocytes always remain normal in number. In carcinoma of the prostate, however, he finds a diminished eosinophil count in 45 per cent of cases, while the neutrophil polymorph count is always increased. This research shows that a blood-count, together with the routine investigations for arriving at the differential diagnosis between carcinoma and simple hypertrophy of the prostate, may be of value in doubtful cases. When an increased eosinophil count is accompanied by an increased neutrophil polymorph count, the author considers that this may well indicate a case of carcinoma.

BENIGN PROSTATIC OBSTRUCTION.

In an article on the nature and cause of old-age enlargement of the prostate, Kenneth Walker² emphasizes the fact that while some degree of prostatic enlargement after the age of 50 is the rule, yet many of these individuals never show any disability therefrom. He rejects the theory of inflammatory causation, and while admitting that the adenoma theory is most commonly held at present, considers the arguments against it to be very strong. He is inclined to attribute the cause to a degenerative process, not secondary to arteriosclerosis or changes in the testes, as has been suggested, and not the result of hypertrophy of the subcervical glands independently of prostatic change, as suggested by Motz and Pearnau, but a prostatic enlargement which is part of a condition affecting the whole genital tract in which changes are found in the testes, the prostate proper, the peri-urethral, subcervical, and subtrigonal glands, and probably also the seminal vesicles. He has found in both prostate and testicles evidence of a degenerative process that picks out certain tubules in patches. These are associated with an increase in the interstitial fibrous tissue, and fatty degeneration, but whereas the affected tubules of the prostate have undergone a previous proliferation, those of the testes have not. An enlarged prostate has thus undergone a fibro-epithelial degeneration which may be considered as an accidental occurrence during the period of involution of the genital tract, analogous, the author considers, to serocystic disease of the breast. The cause for this change he considers is probably connected with a loss of endocrine balance occurring during the period of involution of the genital tract. [This view had previously been expressed by Paul.—J. T.-W.]

Beer³ states that 'prostatisme sans prostate', 'fibrous prostate', 'contracture

of the neck of the bladder', and perhaps atrophy of the prostate, are some of the many names applied to a clinical condition characterized by the following features: difficulty in emptying the bladder; the presence of residual urine; the easy introduction of instruments into the bladder; as a rule a small prostate as felt per rectum; a negative Wassermann reaction; and a cystourethroscopic picture which the author considers typical—viz., the floor of the supramontane urethra shows directly above the verumontanum a relative falling away or even a cavity, immediately above which is a more or less thick raised bar which forms the inferior circumference of the fibrotic neck. Such a picture he finds occurs almost always in young males complaining of slow stream, and it is identical with that seen in adult cases of contracture of the neck of the bladder. These infantile cases develop, as do the adult cases, marked trabeculation of the bladder, with the formation of pouches of various sizes, secondary dilatation of the ureters, and hydronephrosis. Beer finds that many of the adult cases give a history of urinary trouble dating from early life. As regards treatment, the author advocates suprapubic approach; for, no matter how carefully these cases are investigated, one not infrequently finds other conditions either secondary to or complicating contracture of the neck of the bladder, the presence of which had not been suspected. On the whole he has found the best results to be achieved by a broad excision of the posterior circumference of the neck of the bladder well into the prostatic tissue, with section of any fibrous bands in the prostatic urethra.

Discussing the pathology and mechanism of prostatic hypertrophy, Tenenbaum¹ states that the underlying pathological process is a proliferation of the peri-urethral glands as a result of which the secondary changes in the urinary tract are caused. He thinks that the conception of back-pressure as the primary cause of the changes in the upper urinary tract is inconsistent with the anatomical and physiological peculiarities of the bladder and ureters.

In prostatic disease the size of the adenoma is not in direct proportion to the symptoms, and Legueu⁵ has found that patients with no visible tumefaction are quickly relieved of their symptoms by the removal of a small amount of tissue which microscopically, in some cases, has the characteristics of an adenomatous growth. He states that in a study of prostatic disease in a large series of cases, he has found tumours ranging from 300 grm. to 200 grm. which cause similar symptoms, and that in 78 of 300 cases he has removed urethroprostatic tissue weighing less than 15 grm. These cases he classifies into three groups, showing variations from the enlarged prostate with definite adenomata to the 'prostatic without prostate', all with similar symptoms. Legueu believes that in prostatic disease the neck of the bladder becomes rigid and loses its flexibility and elasticity, and is unable to open itself, giving rise to the abnormal micturition. These same alterations of the neck are found in cases with adenomata in which the mechanical obstruction is evident. For this reason he removes the neck in all cases, in the belief that the retention is due to its condition rather than to any other mechanical obstruction which may be present.

Geraghty⁶ considers that the condition of 'prostatisme sans prostate' or 'median bar' obstruction is due to inflammatory infiltration at the internal urinary meatus. Involvement of the fibres of the internal sphincter causes narrowing of the outlet and a decrease in relaxation of the sphincter. He finds that complete and permanent relief may be given by simple division of the internal sphincter posteriorly, and for this purpose he has devised an instrument for such division per urethram under local anæsthesia.

Bugbee⁷ states that obstructions of the vesical outlet in the male are very common, and the majority are due to prostatic enlargement or contraction; in

a few instances, congestion without hypertrophy, acute infection, prostatic abscess, and nerve lesion are responsible. Prostatic obstruction resolves itself into three main classes: that due to fibrous prostate with contraction of the vesical neck; simple hypertrophy; and carcinoma. In the treatment of the first he has obtained good results by the transurethral removal of sections of the constricting ring by means of the prostatic punch under local anaesthesia. He considers that such patients should be kept under observation, though recurrence of contraction is rare. To obtain the best results from the treatment of simple hypertrophy, he emphasizes the importance of careful pre-operative study and treatment of the patient, an operation carried out to cause the least amount of shock, and scrupulous care in the post-operative treatment. Prostatic cancer requires the most careful investigation, although unfortunately symptoms are often delayed until malignancy is far advanced. The presence or absence of metastases should first be determined by physical and radiographic examinations. In cases in which the cancer is thought to be localized to the prostate, the author considers that the immediate changes obtained by the introduction of radium into the prostate by means of needles implanted through a suprapubic wound or through the perineum, and by means of surface applications to the rectal and urethral aspects of the gland, are distinctly encouraging. The remote results it will be impossible to gauge for several years.

TREATMENT.—Young⁸ states that in reducing the mortality of prostatectomy, most has been accomplished by careful pre-operative treatment. Preliminary urethral or suprapubic drainage, together with forced fluids by the mouth, subcutaneously, or by intravenous injection, he considers to be essential in cases with evidence of renal impairment. {He determines the *renal function* at intervals during treatment by using phenolsulphonephthalein, which is eliminated more rapidly and in greater quantity by a healthy than by a diseased kidney. In 551 cases of prostatic hypertrophy in which he used the phthalein test, first on admission to hospital and again before operation, renal function improved in 99 per cent of the cases so much after the pre-operative treatment that the drug was being excreted at the time of operation to the extent of 20 per cent or more. With a very low phthalein excretion on admission, he estimates the blood-urea as an additional test, and finds that the blood-urea drops almost to normal (0.3 grm. to 0.5 grm. per litre), and the phthalein excretion rises considerably in most cases during the treatment. While marked renal impairment is not often found with residual urine of less than 400 c.c. (14 oz.), the author finds it occasionally with small residuals of 100 c.c. (3½ oz.) or less, and thinks this is probably due to frequent and prolonged urination, during which the ureters are closed and pelvic distention occurs. The onset of infection may greatly accelerate the renal impairment; severe cystitis, especially if associated with vesical calculus, increases vesical spasm and consequent back-pressure. The lower the phthalein test at operation the greater is the mortality, and the author continues the above treatment, if possible, until the phthalein test is 30 to 40 per cent. Cases with a mild pre-operative cystitis are less subject to post-operative fever and toxæmia than the previously sterile cases; but whether or not this is the case, the danger from a virulent organism—especially a coccus infection—is such that, besides cleansing the external genitalia, he irrigates the anterior urethra before any instrumentation with a 1 per cent solution of merocryl, which is non-irritating and acts in the presence of albumin, pus, and urine. The author considers that almost every case can be brought into condition for perineal prostatectomy without a first-stage suprapubic drainage. The author lays stress on the importance of the administration of fluid by the mouth,

subcutaneously, and in grave cases intravenously, in the after-treatment of all cases. In very feeble cases blood transfusion is stated to be invaluable.

Smeaton⁹ considers estimation of the urea-nitrogen in the blood to be the most trustworthy guide to correct judgement of the stage disease of the urinary tract has reached, and of the risk accompanying operation. With 30 mgrm. or more of urea-nitrogen in 100 c.c. of blood, he regards prostatectomy as dangerous; for safety there should be not more than 20 to 25 mgrm. to 100 c.c. Preliminary cystotomy, he states, has been successfully performed with as much as 187 mgrm. to 100 c.c., and following this operation improvement in renal function may be sufficient to allow of prostatectomy in 10, 20, or 30 days. The urea-concentration test he finds to be of value in association with the blood-urea test, and the necessity of these tests, he believes, is shown by the frequency with which clinical observation fails to indicate a dangerous degree of renal impairment.

Negro and Colombet¹⁰ state that the phenolsulphonephthalein test, adopted for the last ten years in Civiale's clinic, has given such good results that at the present time they never perform prostatectomy unless the percentage of phthalein elimination reaches a figure which their experience has shown to be necessary for them to predict an immunity from those post-operative complications that result from renal insufficiency. In 58 cases of enlarged prostate, 48 of which were submitted to prostatectomy, these authors have compared the findings obtained by the phenolsulphonephthalein test with those given by the estimation of blood-urea and the determination of Ambard's constant in each case. From the figures thus obtained, the greater reliability of the first-named test, as shown by the results of operation, is clearly brought out. They emphasize the fact that the phenolsulphonephthalein test is easier to carry out, and that the end-reaction is easy to recognize. The intravenous method of injection is advocated, and if an elimination of at least 45 per cent of phenolsulphonephthalein within sixty minutes of injection is found, they consider that the operation is not contra-indicated so far as the efficiency of the kidney is concerned.

In an address on "Some Problems of Prostatectomy" delivered before the Harveian Society, Thomson-Walker¹¹ emphasizes the fact that many complications which follow prostatectomy may be avoided by careful pre-operative treatment. Post-operative distention of the bowel may occur in all degrees, from a slight flatulent distention with constipation, to a prolonged distention ending fatally from interference with the heart's action. Intestinal fermentation, and exhaustion of the sympathetic nervous system, the result of uræmia, intestinal toxæmia, or shock, are probably factors in its causation. The prevention of this complication is best attempted by thorough treatment of sepsis, restriction of starchy foods and green vegetables in the diet, the use of intestinal antiseptics and bowel tonics, and the avoidance of saline purgatives. If the bladder is not distended, abdominal massage and electrical treatment of the bowel are of use. After the operation, the bowel is not interfered with for three or four days, when a dose of castor oil is given; but if distention of the abdomen develops, castor oil should be given at once, and with gastric distention and persistent vomiting the stomach should be washed out, repeatedly if necessary. In the more common cases, with distention of the colon and hiccup, but no vomiting, pituitrin is of value, as are ergot and strychnine; and a high rectal tube with colon lavage, followed by the insertion of a tube in the rectum with the patient lying on his side, will empty the lower bowel. Enemata, while of great value, should be given with care, especially if they contain turpentine.

In discussing renal inefficiency, he states that the forced urea-concentration

test, and the blood-urea test, should not be taken at their face value as a rule-of-thumb indication for prostatectomy, for these tests indicate merely the reading of the renal function at the time and under the conditions that the test was made. A temporary depression, due to existing obstruction and back-pressure on the kidney, must be distinguished from a permanent reduction of renal function due to chronic interstitial nephritis, for the former can in large part be eliminated by careful treatment, and only then is a true clinical picture of the case obtained. The forced urea-concentration test comes nearer to estimating the reserve or potential renal function than any other test we possess. In any case, the renal function tests form only one factor among many in estimating the prognosis for operation; these factors include the clinical condition of the patient, the experience of the operator, and, above all, the experience of those who will have immediate care of the patient after the operation. His routine practice is to perform a one-stage operation, but in cases of chronic urinary retention, cases of sepsis, and in cases in which catheterization is difficult or impossible, and some serious complication such as bronchitis or pneumonia is present, he prefers a two-stage prostatectomy. Even with chronic urinary retention, however, if the bladder is slowly emptied by the retained catheter, and, when empty, the pressure is kept at zero by continuous drainage, he prefers to dispense with a preliminary cystotomy. Early operation on prostatic cases is advocated, in order to avoid septic infection, the result of catheterization, so as not to miss insidious cases of chronic urinary retention, and, finally, because malignant changes may take place in a prostate the seat of simple enlargement. He considers that all cases in which the gland is causing sufficient obstruction to produce residual urine of one ounce or more on several examinations, or where a large elastic gland is present but does not produce residual urine, require operation.

After describing his open method of prostatectomy, he discusses the prevention of post-operative sepsis. The entire elimination of the rectal finger, the making of an abdominal incision sufficiently long to give free access to the prostate so as to permit of gentle enucleation, the complete removal of partly detached shreds of mucous membrane and prostatic capsule, of prostatic nodules, and strips of the urethra, are of great importance, together with careful after-treatment by daily irrigations either through a catheter so placed that the eye lies in the lowest part of the prostatic cavity, or by Janet's method. In cases of sepsis persisting after operation in spite of energetic pre-operative treatment, the question should be raised as to whether the vesicles are the source of the infection, and whether a transvesical operation for their removal should not be done. The author prefers spinal anaesthesia, induced by a modified dose of stovaine, together with the giving of just sufficient C.E. mixture to render the patient unconscious. Owing to the tendency to a fall in blood-pressure during spinal anaesthesia, this method is best avoided, however, where the arteries are very rigid and myocardial changes are present.

Barney¹² considers that the patient whose urine is already infected before he seeks relief is often a better risk than the one who acquires his infection during pre-operative preparation or at operation, in that the patient has immunized himself. With the idea of establishing artificial immunity, from March, 1913, to July, 1917, he treated patients at his clinic who were found to have an uninfected urine with from one to four injections of vaccine, each injection containing from 500 to 1500 million dead colon bacilli. Practically no reaction followed the injections, and the clinical course of the case appeared to be uninfluenced by this treatment, which has now been abandoned. Similar vaccines have been used at other clinics, with equally disappointing results.

Dennis¹³ reports six cases of benign hypertrophy of the prostate in which he

used Radium after Barringer's method, and states that satisfactory results were obtained. He believes that treatment by this means, possibly followed, in cases with a large intravesical projection, by Young's simple punch operation, may yet relieve benign prostatic hypertrophy of much of its dangers. His case-reports show that at least 300 or 400 milligram-hours may be given a single lobe at one sitting. The placing of the needles was practically painless, and very little discomfort followed except in three instances. In one case the presence of a needle in the prostatic urethra was responsible, and in two cases a rigor with high fever followed in about five hours, but had disappeared entirely in one case the next morning, and in the other case after a few days.

Chute¹⁴ discusses the use of Spinal Anæsthesia for prostatectomy from his experience of 328 prostatectomies. The advantages are: the good abdominal relaxation obtained; the lowering of the blood-pressure to a certain degree, not only at the time of operation but for some time after; the possibility of being able to begin giving water by mouth immediately on the patient's return to bed; and the ability to work with all necessary deliberation, which he thinks is of great importance, as for instance in the careful control of bleeding. Another advantage of spinal anæsthesia is that it may be used in prostatic patients suffering from diabetes. In only slightly more than 7 per cent of his cases was it necessary to supplement the anæsthesia with gas or ether, which was given in a considerable number of these cases because of the mental instability of the patient rather than because of physical suffering. In no case was any evidence of lasting injury caused by spinal anæsthesia found to occur. He is of opinion that this anæsthesia produces less damage to the kidneys than general anæsthesia, which more than compensates for its drawbacks, and makes it the best anæsthetic for use in a considerable proportion of cases of prostatectomy.

Cunningham¹⁵ has devised an *apparatus for the control of hæmorrhage* from the prostatic cavity, together with the provision of adequate bladder drainage. A catheter is passed into the bladder, after prostatectomy, and drawn through the suprapubic wound. A metal cap, fixed to the penile tube of a Pilcher bag, is fastened to the catheter, which is withdrawn, bringing the penile tube of the bag through the urethra, and drawing the bag, to which a suprapubic drainage tube has been fixed alongside the inflation tube of the Pilcher bag, into position in the prostatic cavity. With the finger, the free edges of the mucous membrane are tucked downwards over the vesical sphincter, the Pilcher bag is inflated with air, and the inflation tube, which passes downwards from above alongside the suprapubic drainage tube as already mentioned, is clamped. The incision in the bladder wall is sutured about the suprapubic drainage tube and the inflation tube lying alongside it. About twenty-four hours later the air is allowed to escape from the bag, which is, however, left in position. If bleeding occurs, the bag is re-inflated, and if there is no further bleeding in the next twenty-four hours, the apparatus is removed, and suprapubic drainage continued by the introduction of a large de Pezzer catheter through the suprapubic wound.

Geraghty¹⁶ describes a new method of perineal prostatectomy which he has used in ten cases. His modification is designed to avoid exposure of the membranous urethra and disturbance of its intrinsic and extrinsic musculature, and thus to obviate the partial incontinence or even permanent loss of control which is apt to occur after Young's operation, particularly in cases in which the prostate is large.

Cecil¹⁷ describes a technique for performing perineal prostatectomy, carried out with the aid of a long curved prostatic tractor which is introduced through the whole length of the urethra into the bladder. The compressor urethræ

muscle is avoided. [This operation is similar to that described by Geraghty.—J. T.-W.]

Rubritius,¹⁸ discussing two-stage prostatectomy, states that this method has been adopted because the results of the single-stage operation have not been uniformly satisfactory, and because by this technique it is possible to give relief in a much larger number of cases, including those in which the second part of the operation is not performed. In 11 cases dealt with by the author in this fashion, the intervals between the two stages ranged from thirteen days to six months. There were 2 deaths.

MacKenzie and Seng¹⁹ review the results of operation upon 226 cases of simple enlargement of the prostate, performed during the past five years. In 5 cases the perineal route was used, with no deaths; in 57 a one-stage suprapubic operation was performed, with 2 deaths; in 158 cases a two-stage suprapubic operation was carried out, with 3 deaths; and in 6 cases suprapubic drainage only was advisable, and of these 3 died, the high mortality after drainage alone being due to the fact that all these cases were *in extremis* on admission. The authors state that none of the deaths were due to uræmia. They are of the opinion that for the general practitioner and the general surgeon, the two-stage suprapubic operation is the safest and simplest method of performing prostatectomy. The preliminary cystotomy is performed under local anaesthesia, and they advocate the opening of the bladder at its highest point, with the introduction of an anchoring suture of heavy cutgut, which passes through the vault of the bladder and on either side through the rectus muscle and rectus sheath at a corresponding level, the suture being tied after the rectus sheath has been sewn up. This step, they claim, prevents herniation of the peritoneal fold into the wound. There is no urgency for the second stage; the suprapubic drainage may be continued for months if need be. The authors dispense with all catheters, tubes, packing, and all methods of drainage except in so far as drainage occurs through the suprapubic sinus itself, after enucleation of the prostate. The wound is not sutured, and a dressing is applied, and in the ward, whenever clots form, these are removed, the bladder never being allowed to become distended. If bleeding is severe, a Freyer tube is inserted, and through this the clots are removed as they form. The authors, however, point out that hæmorrhage following suprapubic prostatectomy by the two-stage method is rare. The number of days during which suprapubic drainage was carried out between the first and second stages in their two-stage cases was an average of 17, 3 days being the shortest interval, and 65 days the longest.

[Suture of the bladder to the recti at the upper angle of the wound may be followed by eversion of the bladder walls through the wound if there is a tendency to hernia formation. This form of hernia is difficult to cure by operation.—J. T.-W.]

Fullerton,²⁰ in a paper on the diagnosis and management of cases of enlarged prostate, lays stress on the importance of using the cystoscope and urethroscope with caution, as, even when used with the greatest care, considerable trauma might be inflicted on the distorted urethra, which could easily lead to fatal results, especially in septic or uræmic cases.

Cecil²¹ gives a detailed study of 100 consecutive cases of perineal prostatectomy. In 93 cases preliminary treatment was carried out with an indwelling catheter, or with an indwelling catheter combined with intermittent catheterization; in 2 cases intermittent catheterization alone was employed; and in the remainder suprapubic drainage. Young's operation was performed in every case, great care being taken to preserve the external sphincter, and to expose the prostate fully, after which an attempt was made to preserve

the prostatic urethra by utilizing lateral incisions outlining the ejaculatory bridge and the prostatic urethra, or by throwing back a triangular portion of the prostate, or by means of a single lateral incision enucleating the adenoma and tearing away part of the prostatic urethra in one mass. In 5 per cent of the cases the wound closed before the ninth day, in 22 per cent before the fourteenth day, in 51 per cent before the nineteenth day, and in 74 per cent before the twenty-fourth day; in one case closure took 133 days. In one case permanent incontinence resulted. In 11 cases carcinoma was found. The mortality in this series was 2 per cent.

Hinman,²² in a comparative study of 90 cases of perineal and 38 cases of suprapubic prostatectomy operated upon by himself under the same general conditions of pre-operative and post-operative care, states that in his hands Young's perineal prostatectomy excels the suprapubic operation in every respect. It has given a mortality of 2.2 per cent as against 15 per cent, and a percentage of 83 cures as against 38, in spite of the fact that the more difficult and the more grave surgical risks were submitted to the former operation. He has a record of 81 consecutive unselected cases successfully operated upon by the perineal route without death. Recto-urethral fistulae, persistent perineal fistulae, and incontinence of urine have been absent in all his later cases, and, though five years is the longest time since operation, no case has returned with recurrence of prostatic symptoms. He considers that the generally poor results reported for Young's operation are directly attributable to the inexperience of the operator rather than to any fault of the operation. The anatomical approach and the actual glandular enucleation are the two main technical difficulties. Carelessness with the first leads to injuries to the rectum or external sphincter, and with the second to structural defects, with either persistence or recurrence of prostatic symptoms. Success with the first is attained by experience and a knowledge of the anatomy of the perineum; while prevention of the structural defects is best secured by a complete and clean removal of the hyperplastic prostate, which the writer considers is best secured by the accurate dissection intact of the hypertrophied mass under direct control of the eye. In 25 cases in which the author has applied this technique he has obtained functional cures in 100 per cent.

After prostatectomy, Kleiber²³ prevents bleeding from the raw bed of the prostate by drawing a tampon down into this bed with a string held in a Belloq cannula, introduced from the urethra below, the tip emerging in the suprapubic incision. This does not interfere with the drainage of urine through the incision. The only drawback is the tenesmus induced by the pressure of the tampon, but this can be relieved by a sedative suppository. The author thinks that the epididymitis which often follows prostatectomy is caused by infection from the retention catheter, and for this reason he postpones its use for a week, using smaller and smaller drains in the meantime.

Berg and Butler²⁴ record a case of *peritonitis as a complication of prostatectomy*. At the operation the peritoneal cavity was opened accidentally and closed immediately; four days later the patient died with all the signs of an extensive acute peritonitis, which diagnosis was confirmed at autopsy. The authors state that accidental opening of the peritoneal cavity is most easily done in performing the second stage of a two-stage prostatectomy, and they mention several methods for obviating this, in which the underlying principle is to separate the peritoneal fold well off the fundus of the bladder at the first-stage operation and to anchor it high up with one or two sutures.

White²⁵ discusses the *relationship of epididymitis to suprapubic prostatectomy* on the basis of a study of 50 cases. In only 38 per cent of the cases did he find the epididymes normal previous to operation. Subsequent to operation 82

per cent of all the cases gave clinical evidence of epididymitis, the degree of inflammation varying from the mildest form in which it could be detected by palpation, causing no symptoms, to the suppurative type accompanied by marked local and constitutional disturbance; 4 per cent of the cases were of the latter type. The author emphasizes the importance of sepsis in the prostatic cavity, and of post-operative urethral instrumentation, as factors in the causation of the complication in question. Nine cases in the series were subjected to a two-stage prostatectomy, and in none of these did an acute epididymitis occur.

The same author,²⁶ from his observations of 68 consecutive cases of suprapubic prostatectomy, concludes that too early removal of the suprapubic drain tends to delay convalescence, and that rapid closure of the fistula is not always desirable. Closure should be accomplished in all cases if possible without resort to an indwelling catheter, and in his series this was achieved in about 52 per cent; in 38 per cent by the twenty-eighth day after operation. In about 48 per cent, however, he found an indwelling catheter to be necessary in order to avoid an unduly prolonged convalescence. The catheter should not be inserted until the fistula is clean, granulating well, and small, and is judged to be about to reach the 'wet and dry' stage, so that by its use closure will occur without necessitating its retention for more than three days. No complications arose from the use of an indwelling catheter for three successive days in any of the cases in which it was employed. In 66 per cent the fistula had closed with or without the aid of an indwelling catheter by the end of the fourth week. In the remaining cases the chief causes of delay in closure were: (1) Complications preventing the use of an indwelling catheter such as epididymitis and pyelonephritis; (2) Delayed onset of spontaneous micturition, which occurs most commonly in cases that have had previous chronic retention; (3) Long-standing suprapubic fistulae in two-stage prostatectomy cases; (4) The development of a shelf of mucous membrane between the bladder and the prostatic cavity.

In a paper on "Healing after Prostatectomy", Bonneau²⁷ states that in preliminary cystostomy the opening in the bladder should not be made near the bladder neck or the pubes, as conditions here are less favourable for healing. For a persistent fistula it is better to open up the fistula, curette, disinfect with a silver nitrate stick, and drain with nitrate wicks.

Honegger²⁸ describes the occurrence of a number of small nodules which had developed in the prostatic cavity after enucleation of the prostate, apparently from the capsule left behind, which was shown microscopically to consist of compressed prostatic tissue.

In a paper on continuous irrigation of the bladder after prostatectomy, Suter²⁹ states that in order to accustom the patient to the catheter, he is kept in bed for several days before the operation, and the bladder is drained by an indwelling catheter. After prostatectomy and drainage of the bladder with a large tube, a douche-can with a drip device is connected with the indwelling catheter, and continuous irrigation is established. On the fourth day the tube is removed and a smaller tube inserted, irrigation being kept up for two or three days longer; the small tube is then removed, and the indwelling catheter used merely as a drain. Among the first 20 cases thus treated there were 3 deaths, but in the 80 subsequent cases only 1 died.

MALIGNANT DISEASE OF THE PROSTATE.

Symmers³⁰ has recently studied a primary tumour of the prostate presenting the characteristic structure of a *lymphosarcoma*, and states that he has been unable to discover in the literature an acceptable description of such a growth,

with the exception of one recorded by Compland in 1877, which occurred in a man of 29. The author's case occurred in a man, age 30, who during seven weeks before admission had lost 20 lb. in weight, had become very constipated, and had developed sharp pain in the region of the left kidney which radiated to the left iliac fossa. He was troubled with marked frequency of micturition, with, on one occasion, great difficulty for a period of seven days. The urine revealed nothing abnormal beyond a small number of pus-cells. The Wassermann reaction and X-ray examination of the urinary tract were negative. The blood-count showed 4,200,000 red cells, 12,800 white cells, 81 per cent of which were polymorphonuclear leucocytes and 19 per cent lymphocytes. The hæmoglobin percentage was 70. Cystoscopy failed, owing to inability to pass the prostatic urethra. On post-mortem examination, the region of the prostate was occupied by a growth measuring 9 cm. in diameter and 7 cm. in length, which surrounded the posterior urethra and was continuous with the lower third of the bladder, the wall of which was thickened and, on section, presented a pale, smooth, cream-coloured surface. The bladder was dilated, and the seminal vesicles were embedded in the growth and compressed. The rectum was not involved, but laterally, on each side, the growth had invaded the psoas muscle. The pre-aortic and juxta-aortic glands, from the brim of the pelvis to the level of the pancreas, were enlarged, and on section were smooth and cream-coloured. The left kidney was enlarged, the surface studded with small cream-coloured elevations, while on section similar bodies were present in the medulla near the pelvis. The ureters, dilated in their upper part, were compressed lower down by the tumour tissue lying on either side of the spine. The left suprarenal capsule was buried in similar tumour tissue. The liver was enlarged, and showed neoplastic infiltration also, while a solitary metastatic deposit was present in the left parietal pleura. Microscopic examination of the primary and secondary growths revealed vast numbers of small round cells, presenting the histological characteristics of lymphocytes, which in all sections examined gave not the slightest indication of a glandular formation. The author considers that these two cases clearly prove that lymphocytic tumours arise in the prostate, and thinks that the development of a prostatic tumour in a man before the age of 35 should lead one to suspect lymphosarcoma. He states that the prostate, in common with the suprarenal capsule, thyroid, lung, liver, kidney, testicle, and other organs, normally contains interstitial lymphoid foci, which in certain conditions of disease are readily identified. These lymphoid rests are functionally dormant, and undergo hyperplasia only in unusual circumstances, whereas the follicles of the lymphatic glands, spleen, tonsils, gastro-intestinal tract, etc., by virtue of their presumably greater activity, are more frequently subject to disturbances of cell equilibrium.

Bettoni³¹ has collected 48 cases of *sarcoma* of the prostate reported since 1902, and records a case of his own. Of these cases, 34 per cent were in children under ten; and of the 20 cases operated upon, only 2 patients survived longer than two months after the operation, one of these dying of recurrence five years after operation. Treatment by radium has given encouraging results.

Joll,³² in a paper on *metastatic tumours of bone*, after discussing the mode of origin of such tumours, concludes that the evidence is preponderatingly in favour of the claim that bone metastases are blood-borne, and that they are due to the lodgement of malignant emboli in the cellular marrow. He considers that primary tumours of the prostate have perhaps the greatest tendency of all the primary tumours to produce secondary deposits in bone. In such deposits, new-bone formation may be very marked, sometimes amounting to a diffuse formation of bone involving the whole shaft, obliterating the marrow cavity, and even forming bony outgrowths which project from the surface,

The new bone may be almost spongy in consistence, or on the other hand extremely dense, and if the bone-marrow is extensively replaced by it, severe secondary anæmia, even simulating pernicious anæmia, may occur. It is to the carcinoma cells themselves that the capacity to produce this new bone has been ascribed, and such secondary growths may resemble very closely the diffuse inflammatory osteoperiostitic lesions, most commonly due to syphilis. Occasionally the primary growth in the prostate may be so small as to be overlooked during life, but a suspicious area in the prostate, when associated with a bony tumour of doubtful origin, would have a special significance. The first deposits are found in the spongy osseous tissue, where cellular marrow is found, according to Sasse, who considers that this is only to be explained on the theory of conveyance through the blood-stream. Osteoclastic changes go on side by side with osteoplastic changes; hence spontaneous fractures are quite compatible with a high degree of the latter in the bone (*Plate XLI*).

The whole of the urinary tract seems to share with the prostate in the tendency to metastases in bones. A case is presented of an extensive villous papilliferous carcinoma of the bladder with a secondary deposit in the radius, microscopic section of which shows the transitional papilliferous carcinomatous structure of the primary growth very exactly. Similarly, a metastasis in a rib secondary to a papilliferous carcinoma of the renal pelvis is mentioned, but in this case the papilliferous structure is not so well reproduced in the secondary growth.

Malignant disease of the kidney and adrenal gland is noteworthy in the production of metastases in bones; and primary neoplasms, especially if in stout persons, may be missed even when special attention is directed to this possibility. Of the five cases of renal and adrenal neoplasm with metastasis in bones mentioned at the discussion at the Royal Society of Medicine in 1920, the bone metastases were in every case treated as primary lesions, because of the obscurity of the primary growths.

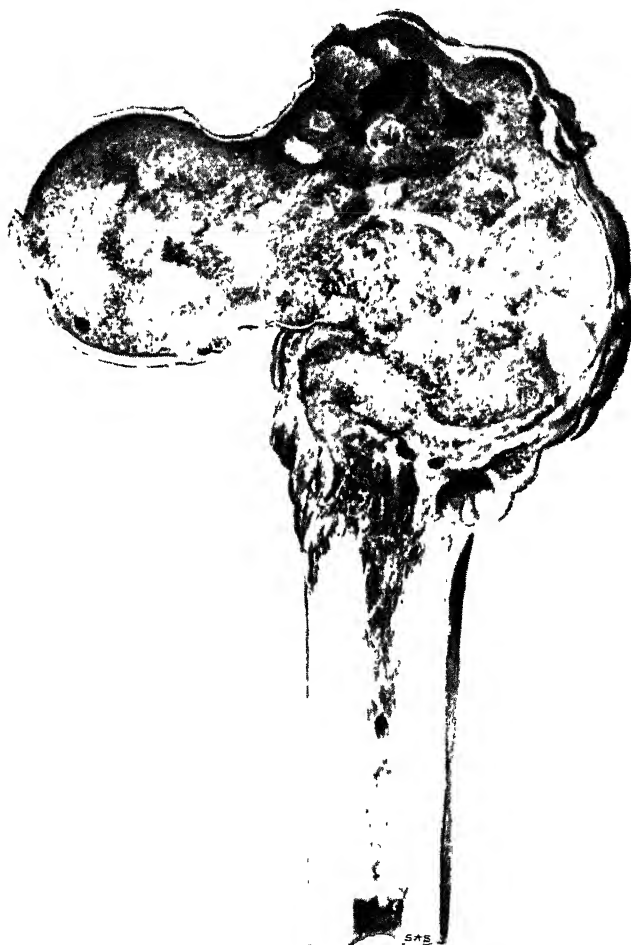
Carcinoma.—Giordano and Bumpus³³ state that metastasis from carcinoma of the prostate is usually detected first in the lumbosacral region. Of 297 cases examined radiographically, 84 showed metastasis in the bones. The next most common site of metastasis is in the lymphatics draining the prostate, the glands at the bifurcation of the common iliacs being usually the first to become involved. From these, invasion of the glands of the promontory, and then the pre- and juxta-aortic glands are invaded. Extension by this route often occurs so rapidly that the supraclavicular lymph-glands are involved before the malignant change in the prostate is suspected. In about 8.47 per cent of patients in whom metastasis can be demonstrated, the lymph-glands on the left side of the neck are affected, which, they state, leads the stomach to be regarded as the primary focus, particularly in that 11 per cent of patients with malignant disease of the prostate complain of no urinary symptoms. Only rarely are metastases from a malignant prostate found in the abdominal viscera. The authors, however, report a case of their own in which, at autopsy, a metastatic deposit was found at the uretero-pelvic junction, and also in the upper pole, of the left kidney. Numerous metastatic nodules were found scattered throughout the pleuræ and lungs, and the aortic lymph-glands were extensively affected from the bifurcation to the level of the first lumbar vertebra.

Barringer,³⁴ discussing carcinoma of the prostate, found that, out of 145 cases, in only 2 was the carcinoma, as far as could be determined by palpation, confined to the prostate, 1 case was borderline, whereas the remaining 142 cases showed extension either along the vesicles to the bladder, to the lateral walls of the pelvis, or by metastases to distant parts. In only 3 cases did the growth extend through the rectal wall at the site of the prostate, and in each

PLATE XLI.

MALIGNANT DISEASE OF THE PROSTATE

(CECIL A. JOLL)



Secondary prostatic carcinoma in upper end of femur. Head and neck extensively infiltrated. Spontaneous fracture. Much new bone formation. R.C.S. Collection (unmounted).

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this was accompanied by a vesico-rectal or urethro-rectal fistula. In one patient a metastasis in the anterior urethra was found. In another, while the clinical picture was that of prostatic carcinoma, the pathological report showed a squamous-celled carcinoma undoubtedly originating in the bladder. As regards early symptoms, 115 had as the first symptom disturbance of micturition, such as dribbling, dysuria, nocturia, frequency, difficulty, or retention, or a combination of these. Hæmaturia was a first symptom in 8, and a subsequent symptom in 25. Pain unassociated with micturition was the first symptom in 7, and the second symptom in 5. As a first symptom œdema of the legs occurred in 1, swelling of the testicle in 1, constipation in 1, and bleeding from the rectum in 1. Notwithstanding that the cases were first seen within two to twelve months after the first appearance of symptoms, yet in all these cases the carcinoma had grown beyond the prostate. From these facts the author emphasizes the importance of the regular examination of the prostate of all patients beyond the age of 50 irrespective of the appearance of symptoms, which he considers to be the only rational method whereby we may hope to get these cases early. For use in cases in which the diagnosis is doubtful, the author recommends a needle with a small cutting-screw at the point, with which prostatic tissue is obtained. The needle is inserted through the perineum under novocain anæsthesia into the prostate, a finger in the rectum guiding it. The author has used this needle 33 times, and in 16 prostatic tissue was obtained, which on 9 occasions proved to be carcinomatous. He finds that the results of radium treatment are superior to operation, both in causing regression of the disease and in coping with urinary retention.

TREATMENT.—Herbst and Thompson³⁵ state that, from the standpoint of treatment, cancer of the prostate falls into three pathological groups: (1) A scirrhus type, which usually begins in the posterior lobe as small flat or nodular areas, harder than the normal gland tissue, but at times difficult to palpate. This type may invade the entire posterior lobe and spread upwards along Denonvillier's fascia between the seminal vesicles, sometimes involving them. Metastases are common, and frequently develop early in this type. These patients do not have any urinary symptoms until late, because the process develops and spreads behind the urinary tract rather than into it; so that not infrequently the first symptoms are due to metastases. (2) A combination of the above type with a benign hypertrophy of the prostate, a rather common form of tumour, difficult to differentiate from simple hypertrophy; in such cases, on attempting to enucleate the adenoma it is found adherent to the posterior lobe, and this may be the first sign of malignancy. In this type, urinary symptoms develop early, and it is easier to control in that the patients present themselves earlier for treatment. (3) A less common form of tumour is that in which the entire gland is the seat of an adenocarcinoma forming a smooth and symmetrical but hard enlargement of the prostate. Obstructive symptoms occur early owing to invasion of the prostatic urethra and bladder, but metastases are not as frequent as in the foregoing types. In this condition also the early onset of symptoms leads patients to seek relief before metastases have developed. The first two types are the most malignant form of the disease. For over six years Radium needles applied through the open bladder have been used by the authors, because of the easy access to the tumour and because of the relief given to the urinary retention. After giving perineal insertions a fair trial, they have returned to the suprapubic method of exposure and embedding of needles, using perineal methods and intra-urethral applications as supplementary forms of treatment.

Geraghty³⁶ discusses the treatment of malignant disease of the prostate and bladder. He considers that 75 per cent of cases of prostatic carcinoma

have an associated prostatic hypertrophy, or that a previous adenoma was present which had subsequently become replaced by cancer. In only 25 per cent of cases does he consider the carcinoma to be not associated with adenoma. He states that in 95 per cent of cases of carcinoma of the prostate, surgery alone is hopeless, as regards total removal of the malignant disease. Since 1915 he has used radium, either alone or in combination with operation, in 150 cases, and although as the result of this the gland in some cases decreased in size, lost its stony hardness, and became rather elastic, yet the symptoms of obstruction were not much influenced, and, in cases with a large amount of residual urine or complete retention, prostatectomy was performed. In every case operated upon, after the employment of radium, distinct cancer tissue apparently unchanged could be found in the removed gland. He considers that when little or no obstruction is present, radium is of value in the treatment of a malignant prostate.

Bumpus⁴⁷ compares the results obtained by radium and surgical treatment in cases of cancer of the prostate, and concludes that the results derived thus far from radium are inferior to those obtained by surgery; but he thinks that the new methods of radium application will give results in the future equal to those obtained by surgery. Partial prostatectomy in cases of carcinoma occasionally proves to be a curative rather than a palliative procedure; but he considers a combination of radium and surgery to offer the best results. The author considers that, in cases in which carcinoma is confined within the capsule of the prostate, in which it has involved only the lower part of one or both vesicles, and in which it has not penetrated the capsule or fascia of Denonvillier, radical removal can be attempted with strong probability of a complete cure and a good functioning bladder with perfect control and without urethral stricture. Unfortunately the great majority of cases present themselves much too late for radical operation. Details of treatment are given, and the author concludes by stating that with his technique really remarkable results are often obtained in apparently incurable and very extensive cases. In some cases, apparently, radical cures have been obtained, but time is yet too short to pronounce definitely on this point.

Young⁴⁸ describes in detail the technique employed for the radium treatment of cancer of the prostate and seminal vesicles. He has devised a cystoscopic radium apparatus by means of which the element can be placed upon a certain spot under the direction of either the cystoscope in the bladder or a finger in the rectum. The radium contained in a small platinum tube is surrounded by a metal cap covered with hard rubber, and this is placed at the end of a rod which, by means of a cystoscopic clamp, is held at the desired spot along the posterior surface of the prostate or vesicles, or along the pelvic wall. Since the introduction of the needling method for radium application through the perineum, the author has constructed an instrument which contains within the beak four needle points each containing $12\frac{1}{2}$ mgrm. of radium surrounded by a cap of silver which in turn is surrounded by guttapercha. After a careful preliminary study of a given case, if the diagnosis is clear on rectal examination, and the absence of calculus is shown by X rays, cystoscopy is not carried out, as it is much more painful in cases of carcinoma than in those of hypertrophy. If there is doubt as to the diagnosis, cystoscopy is performed and is of diagnostic importance.

Deming⁴⁹ discusses the results of radium treatment in 100 cases of cancer of the prostate and seminal vesicles. He states that prostatic cancer is of very slow growth, and even four or five years after treatment one is not justified in pronouncing a cure. In his series 20 per cent occurred before the seventh decade, 45 per cent in the seventh decade, and 35 per cent after the seventh

decade. The diagnosis was made in all cases by rectal examination. The prostate was enlarged, broad, irregular, nodular, fixed, and stony hard. The seminal vesicles when invaded were broad, flat, and indurated, forming an intravesicular plateau. In many cases lymph-glands were palpated along the lateral walls of the pelvis. In 90 per cent the seminal vesicles were invaded, and in 51 per cent the membranous urethra, the rectal wall also in 15 per cent, no ulceration, however, being found in the rectal mucosa. Radium treatment was given in courses extending over a period of four to six weeks with an interval of two to three months, after which a second course was given if thought necessary.

The results were grouped as follows: (1) Symptomatic and functional, in which the frequency, dysuria, hæmaturia, dribbling, and the size and force of the stream improved or returned to normal; (2) Local, where a change in the size and consistence of the prostate and vesicles took place; (3) Good, lasting results after four years of complete subsidence of all symptoms, in which the prostate and vesicles became soft and elastic; (4) Cases which showed no relief of symptoms and no actual change in the prostate and vesicles. As regards the first group, in which were 77 per cent of the series, relief of some or all symptoms occurred. Striking results were found in cases with suprapubic cystotomy for relief of complete obstruction, for after series of treatments the wound spontaneously healed and a normal act of micturition was gradually regained. In the second group were 55 per cent of the cases; these showed diminution in size and improvement in consistence of the prostate and vesicles, while palpable glands along the side of the pelvis became indistinct and gradually disappeared. Only 5 per cent were found in the third group, and these responded to radium in a remarkable manner, the patients becoming entirely free from symptoms, and the prostate becoming apparently normal in size; all were in apparent perfect health for four years, but two have since had a recurrence of symptoms. The fourth group amounted to 23 per cent of the cases, not one of these reacting to radium.

Irritation from radium can be avoided by treating widely remote areas in successive treatments, and by alternating between rectal, urethral, and vesical applications. The author considers that at least 1000 milligramme-hours must be given to produce any symptomatic improvement, while 1400 milligramme-hours must be given to produce any perceptible change in the tumour mass; 3000 milligramme-hours must be given to produce symptomatic and local results in the same patient. He considers that the cases which did not respond to radium did not receive sufficient radiation: that large doses must be given in as short a period as possible to produce maximal results; and that combined extraglandular and intraglandular radiation apparently give the most satisfactory results. No general systemic reactions were encountered.

In a further series of 33 cases, radium treatment was combined with prostatotomy; in 28 the radium was pre- and in 5 post-operative. Of these, 12.1 per cent showed an excellent result, 66.6 per cent were improved, and 21.2 per cent remained unimproved. Of these 33 cases, 51.5 per cent have died, in all cases from metastases, the average survival after operation being eleven months.

Cunningham,¹⁰ in a paper on the treatment of carcinoma of the prostate, considers the most unfortunate feature of this disease to be the fact that the primary focus in the gland may develop so slowly as not to cause symptoms of prostatic obstruction before widespread metastases have occurred. Sciatica on one or both sides, often associated with pain in the sacral region and in the groins, is not infrequently the most pronounced symptom of which the patient complains. Clinically, he defines two types of carcinoma of the prostate. In

the more common, the whole gland becomes enlarged, with irregularities of almost stony hardness, and an enlarged hard mass extending laterally toward the pelvic bones and upward in the direction of the seminal vesicles tends ultimately to develop. It is this type which gives the most marked urinary symptoms, because of the onset of obstruction. The other type, the more malignant, producing rapid and extensive metastases, shows relatively but little enlargement of the gland on rectal palpation, and while the outline is uniform rather than irregular, there yet remains the sense of firmness or even hardness. This condition of the gland is most likely to be passed unrecognized.

As regards treatment, he classifies patients with this disease into three broad groups. In one, he considers that an attempt may be made to relieve the prostatic obstruction because of much residual urine, and to eradicate the disease locally by removing as much of the gland as possible, even including the seminal vesicles and prostatic sheath in certain instances, then leaving radium in the prostatic area for from 500 to 1000 millicurie-hours according to how much growth is left at the time of operation, and subsequently about three weeks later giving daily radium treatments through the rectum, urethra, and bladder for a period of about thirty days, 100 millicurie-hours being given at each treatment; the operation, if undertaken, he prefers to do by the perineal route; patients in this group are those with symptoms depending upon prostatic obstruction whose general condition permits of such surgical intervention as the pre-operative investigation indicates. The second group includes patients with prostatic obstruction whose general condition is not up to the standard required for the radical operation; in some of these he performs a 'punch' operation, with subsequent radium treatment, or a suprapubic cystotomy followed by the introduction into the gland of needles containing radium through the suprapubic opening at the time that it is made, leaving them for from 500 to 1000 millicurie-hours, subsequently treating the malignant gland by radium therapy through the rectum, urethra, and bladder as previously mentioned. A third and large group includes patients with few distressing symptoms of prostatic obstruction, and patients with recurrence of the disease locally after operation. This group he subjects to radium treatment alone, or combined with regular catheterization and irrigation if necessary to relieve residual urine or bladder infection. The radium treatment adopted by him for this group consists first of the introduction of metal needles containing radium or radium emanations into the gland through the perineum; four $12\frac{1}{2}$ -mgrm. needles may be employed at the same time by placing them in different portions of the gland, and also into the seminal vesicles if desired, when they are left for from 300 to 1000 millicurie-hours. About three weeks later this treatment is supplemented by daily applications of radium for 100 millicurie-hours by means of a special instrument introduced into the prostatic region through the rectum, urethra, and also transvesically, in the ratio of 3 rectal to 2 urethral to 1 bladder application, varying the method of application according to circumstances, and never applying the radium to the same area on successive days. At the end of this course of treatment, the gland, and if thought advisable the seminal vesicles, are again needled as above described. The course of treatment is now for the time being ended. Patients are examined at monthly intervals, and on the changes in the condition depends the decision as to further treatment. The author considers that on the whole patients are symptomatically and locally improved, and that in some cases at least local cures have apparently been achieved.

Thomas and Pfahler⁴¹ describe the technique of the treatment of carcinoma of the bladder and prostate by a combination of surgery, electro-coagulation, radium implantation, and X-ray therapy; 26 patients have been so treated,

with 2 deaths. The majority have been treated and observed only during the last three years. The authors' technique is described in detail, and they consider that this combined treatment offers more in the way of prolongation of life than any method heretofore employed.

MISCELLANEOUS AFFECTIONS.

Tuberculosis.—Schultz⁴² states that among 14,086 necropsies performed between April 1, 1908, and April 1, 1920, he found 125 cases of genital and urino-genital tuberculosis in the male. In as many as 104 cases the prostate was involved; the seminal vesicles were involved in 78 cases, and the epididymis in 66. In 35 cases the prostate was the only gland in the genital system to be involved, and in 23 of these cases both the urinary system and the genital system were in other respects intact. From this he concludes that the prostate was infected by the blood-stream in these 23 cases. All the 125 cases were associated with tuberculosis elsewhere, and, with few exceptions, the lungs and pleuræ were also the seat of tuberculous changes. Isolated 'genito-primary' tuberculosis of the epididymis proved to be exceedingly rare, and only four such cases were observed; in a fifth case the epididymis was the only structure in the genital system affected by tuberculosis, but in this case renal tuberculosis was also found. Schultz concludes that, in the vast majority of cases, the genital system becomes infected by the prostate, and that without this gland, which forms a connecting link between the urinary and genital systems, tuberculosis of the epididymis in conjunction with renal tuberculosis would be rare.

Abscess.—Legueu⁴³ states that during the past few years he has seen several cases of acute retention followed in a few weeks by the development of an abscess of the prostate. The cause of the retention was, he says, infection of a prostatic adenoma. This differs from gonococcal infection in young persons, in that in the latter abscesses form in the prostate itself or its immediate neighbourhood, the glands being the point of origin; whereas in the aged a pre-existing adenoma becomes infected as the result of a general systemic infection. Clinically, the only difference between a young patient with suppurative prostatitis of gonorrhoeal origin, and an aged person with adenomatous prostatitis, is that the first may recover completely after evacuation of the pus, and suffers acute retention for only a few days, while the second will not recover, and retention will persist because the neck of the bladder is definitely and permanently altered. Infection of a prostatic adenoma is indicated by fever and by irregularity and induration of the prostate, which may be very difficult to distinguish on rectal palpation from carcinoma of the prostate.

Massage of the Prostate.—Farman,⁴⁴ discussing prostatic massage, states that this is most beneficial in simple catarrhal prostatitis, chronic parenchymatous prostatitis, and atonic or atrophic conditions of the prostate and seminal vesicles. Prostatic massage should be avoided in all acute primary or recurring inflammatory conditions of the genito-urinary tract. He considers that in addition to the expression of purulent accumulations, the amount and flow of arterial blood and the outflow of venous blood is increased, the diapedesis of leucocytes is promoted, and the immediate effect on the blood-pressure is to cause an initial rise followed by a fall, which in some instances is quite remarkable, with a return to the normal not later than ten minutes after the manipulation.

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PSORIASIS.

E. Graham Little, M.D., F.R.C.P.

Gross¹ has treated psoriasis with intramuscular injections, repeated every two days, of Thymus Extract, beginning with 1 grm. of thymus and increasing the dose up to 6 grm. Bad cases were chosen for the experiment, and the results are encouraging. From 8 to 14 injections, 20 to 30 grm. of thymus, were required to cause eruptions to disappear.

Moore² claims that he has been able to clear the eruption of psoriasis in a series of 34 cases tested with injections of Collosol Manganese, beginning with $\frac{1}{2}$ c.c. of the mixed solution supplied by Crookes, and increasing the dose after two injections to a full c.c., intervals of a week being usually observed. No other treatment was used except local application of vaseline to the patches. In his experience, from six to sixteen injections suffice to clear the patient of eruption. He considers that this improvement with manganese justifies a suggestion that psoriasis is in some way due to staphylococcic infection, an argument in which few will follow him.

Psoriasis and Pregnancy.—Forest³ relates a remarkable experience of two cases of psoriasis in which the eruption had disappeared with each pregnancy, nine times in the first case, six times in the second.

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PSYCHOLOGICAL MEDICINE. (See also MENTAL DISEASE.)

J. A. Hadfield, M.A., M.B., Ch.B.

AUTO-SUGGESTION.

One theory of the psychoneuroses is that they are caused by bad suggestion and cured by persuasion and healthy counter-suggestion. This theory was strongly advocated by Babinski¹ during the war. In peace it has been developed in the methods of Coué and in the teaching of Baudouin.² But whereas Babinski regarded the suggestions as *hetero-suggestions* coming from without, as from medical suggestion, Baudouin regards them as coming from within, they are *auto-suggestions*. Morbid symptoms, fears, obsessions, etc., are the result of auto-suggestion arising from complexes; healthy auto-suggestion may counteract and abolish these by the repetition of certain formule.

In the pre-scientific period suggestions were looked upon as being derived from the physician or hypnotist. The more modern view is that it is dependent on a certain condition of the patient's mind. Coué holds this latter view so strongly that he says that *all suggestion is auto-suggestion*, suggestion springing from oneself. If this means that the idea suggested is always from within, it is obviously untrue, for even a book of instructions forms an outer source of

suggestion. But the saying nevertheless contains an important truth, namely, that no suggestion, even from without, has any effect *unless it is accepted and adopted by oneself*. The hysterical paralysis may be suggested by a physician; it may be produced by a shock or slight wound which suggests permanent injury to the arm, or it may be suggested by a latent desire to draw sympathy or to escape the strain of life. But all these hetero-suggestions must be backed by another condition—the suggestion of the physician and of the wound would have no effect were it not for the receptivity of mind in the patient; the suggestion must appeal to some latent desire within him which seizes upon the suggestion as soon as it is presented.

The therapeutic suggestions which come from the hypnotist must be accepted by the patient before they can be effective; in this sense they are auto-suggestions. This is a truth well worth emphasizing therapeutically, for it lays the emphasis of cure upon the patient rather than upon the physician. So Baudouin³ formulates the theory that all suggestion is auto-suggestion. "Hetero-suggestion, even during sleep (hypnosis), is still auto-suggestion".

These considerations lead us to distinguish two elements in suggestion: (1) The actual suggestion transmitted from one mind to another—suggestion proper; (2) The condition of mind which encourages the acceptance of the suggestion—*suggestibility*. Suggestion is the transmission of an idea from one to another in the absence of criticism, or independent of logical grounds for acceptance; 'suggestibility' is a certain condition or state of mind which makes it receptive to the suggestion thus given, or, in other words, a condition of mind in which criticism is abolished. Definitions of 'suggestion' usually follow one or the other of these lines, some such as McDougall's⁴ and Baudouin's ("the subconscious realization of an idea"), emphasizing the transmission of the *idea*; others, like the psycho-analytic, emphasizing the suggestible condition of mind which makes the idea operative. Freud⁵ defines suggestion as "a conviction which is not based upon perception and reasoning but upon an erotic tie". From the practical point of view, suggestibility is much the most important factor; the actual methods of hypnotizing, etc., are less important than securing a suggestible attitude of mind in the patient.

The more important question then arises: "What are the conditions under which a patient becomes suggestible?" And further, "How are we to explain the facts of auto-suggestion?" The reply to the first question is: The general condition which makes a patient suggestible is, *the dominance of an emotional state*. It would appear that any form of emotion can produce suggestibility—such as the emotion of fear, as in war; of sex instinct; of submission to the herd, as in crowd suggestibility; of submission to authority. This is easy to understand if we remember that emotion tends to check thought and therefore criticism, leaving the individual open to suggestion. So a person under the power of any great emotion, whether of fear, sex, or submission to authority, is apt to have reason and criticism swept away and to be the victim of any strange idea emanating from the circumstances producing the emotion. The person is thus reduced to a condition of suggestibility, and the idea thus transmitted takes on the form of a true suggestion, being accepted implicitly in consequence of the suggestible state of mind. So we are ultra-suggestible when we are terrified with fear; when we are submissive to authority; when we have a strong desire to be cured of an illness; when we are in a crowd; and when we are in love. These are, in fact, the chief occasions of the operation of suggestion.

Coué and Baudouin secure the condition of suggestibility by the monotonous repetition, without effort, of the formula suggesting health of body and mind. By this means the will is kept in abeyance and the suggestions take effect. In

so far as the suggestions themselves are given by oneself to oneself they are auto-suggestions. But in emphasizing the important part played by the patient, Coué and Baudouin have failed to realize the importance of the outside influences which put the patient into a suggestible state of mind, which is the necessary condition of his suggestion becoming effective, even when made to himself. The reading of letters from cured patients, the personal attachment of M. Coué himself, the enthusiasm of the movement, the treatment in groups, all tend to produce or accentuate suggestibility in the patient, prone to accept the suggestion of health, from whatever source it comes. That this outside factor of suggestibility is necessary to cure, and that many patients need the stimulus of the movement, is proved by the fact that many of them relapse when left to themselves—when M. Coué returns to Nancy, they return to their symptoms. It may be literally true then that the actual suggestions come from ourselves; the *suggestibility* is induced through other influences.

Of the various means of inducing suggestibility by the induction of emotion the Freudians have emphasized one, that of love and sex, as being at the basis of all suggestion, the love originally attaching to the parent and being transferred to the physicians.

It is now commonly held that suggestion and analysis, once considered antagonistic and mutually exclusive forms of treatment, are manifestations of the same phenomena, namely, that of 'transference'—the transference of the patient's libido or love hunger from the parent to the physician—which is said to be at the basis both of hypnotic suggestion and of psycho-analytic treatment. Suggestion is then explained as a form of transference—as unconscious sexual attachment of the patient to the physician by virtue of which the one becomes submissive and receptive to the suggestion of the other. "Suggestibility", says Freud, "is nothing else but the tendency to transference".⁶ This reduction of all suggestibility to the dominance of the sex emotion seems at first sight to contradict such phenomena as the suggestibility due to fear, or authority or 'crowd suggestion'. But according to Freud these also are based on erotic ties.

In *Psycho-analysis and the War Neuroses* Freud and others maintain that the traumatic neuroses usually regarded as due to fear, may be explained in terms of the libido (sex-hunger), really self-love. E. Jones' adds: "Freud has made the striking suggestion that the developed dread sometimes found in situations of real danger is derived, not from the repressed sexual hunger that is directed towards external objects, as in the war and with morbid anxiety of the peace neuroses, but from the narcissistic part of the sexual hunger that is attached to the ego, and I venture to suggest that we have here the key to the states of terror with which we are familiar in war neuroses".

Again, the suggestibility derived from authority is of course easily explained in terms of the father complex, the transference being from the father to the physician, whose authority is implicitly accepted. The fundamental bases of group suggestibility is also explained in terms of the libido. We learn that the 'original group' was the father. So that our attachment to the group, and suggestibility to its demands, are merely another example of our libidinous attachment to a father. Since the herd instinct and fear and authority are thus all expressed in terms of love, Freud maintains that his definition holds, that suggestion depends on an erotic tie. According to the original psycho-analytic theory, suggestion resolved itself into attachment to the father,⁶ the originally loved person, for whom the physician is now only a substitute. Suggestibility is nothing else but the tendency to 'transference'. But if suggestion, or rather suggestibility, is to be accounted for in terms of transference and sex, how are we to explain the phenomena of auto-suggestion?

Ernest Jones,⁹ in an article on the "Nature of Auto-suggestion", has applied these conclusions of Freud to the phenomena of auto-suggestion: "In hetero- and auto-suggestion there is equally the consciousness of surrender of the sense of will and feeling of effort. The one point in which the two conditions differ is in respect of the idea on which concentration has taken place. With hetero-suggestion we know that this is the idea of the father *imago* which has been aroused through contact with a suitable substitute; with auto-suggestion all the evidence points to the idea being that of the actual self. These two may in some measure be unified, for the 'ego ideal' is largely derived from the ideas and mental attitudes of the father, to whom the child is attached, but in a narcissistic way, by way of identification, rather than object love". "Auto-suggestion thus reduces itself to narcissism".

FUNCTIONAL AND ORGANIC.

The most important contribution to the problem of the effect of bodily conditions on mental states is that of Sir Maurice Craig,¹⁰ in an article on "Mental Symptoms in Physical Disease". Hypochondriasis is generally considered out of the province of the organic physician; yet Sir Maurice Craig shows how it may originate in hyperæsthesia of the abdominal area from organic causes. Being unable to interpret the hyperæsthesia, the patient interprets it falsely and becomes hypochondriacal. Again, people react differently to physical disease, which in some persons may give rise to emotional disturbances, and these emotional disturbances may in turn lead to defects in appetite, digestion, etc. Thus physical symptoms following physical diseases are not necessarily caused by these diseases directly, but sometimes from the mental worry which results from the primary disease. Indeed, altered sensations may be so severe as to occasion a patient to construct a definite delusion about it. He quotes Head, who "found that under certain conditions some persons suffering from visceral disease are liable to develop hallucinations of sight, hearing, and smell". Craig points out the disturbing effect of these hallucinations upon highly sensitive persons, who fear they are going insane. Again, the loss of sleep consequent on physical disorder, and pain of organic origin, is apt to produce mental symptoms, and Craig maintains that "as a profession we have become unduly apprehensive of giving hypnotics for fear of producing a drug habit, and in delaying the giving of the hypnotic we produce such a fear of not sleeping that this becomes an obsession, and one which is more liable to lead to a persistence of the drug habit than if the sleep had been corrected early before the insomnia had turned into an obsession".

There have been other contributions to demonstrate the influence of physiological processes upon mental processes, so well exemplified in the endocrine secretions. Leonard Williams holds that the key to the neuroses lies in the functioning of the endocrine glands, dominated by (or dominating) the autonomic nervous system. It is difficult, however, as Carver in a review points out, to see how the endocrine secretions can account for a functional monoplegia.¹¹ Although the study of the endocrine secretions has helped greatly our understanding of some mental conditions, the results have on the whole been disappointing. Indeed, it may be said without exaggeration that in recent years psychology has thrown more light on physiological abnormalities, especially hysterical paralysis, vomiting, aphonia, blindness, than physiology has thrown on mental states. It goes without saying, as Sir Maurice Craig has shown, that physiological states (toxæmia) can produce mental abnormalities, but it is going too far to assume, as Sir F. Mott does, that "the functions of mind are dependent upon the whole body", or that "all psychic processes are subordinate

to and dependent upon physiological processes",¹² In the previous sentence, Mott has protested that "no progress was possible in the advancement of our knowledge of mental disease until we had shaken off the spell of metaphysical speculation"; and yet he immediately falls into the error of accepting and dogmatically stating one of these very speculations, namely, the theory—and it is nothing more than a theory—that mental states are wholly dependent upon physiological states. This theory of epiphenomenalism (often falsely called and identified with parallelism) is a legacy to the medical profession from Huxley. It is so generally accepted that many who accept it as fact do not realize that they are accepting what is a pure theory, and that not the most scientific, as to the relation of body and mind. But where is the proof of this 'fact'? Certainly not from the examination of the nervous system, for who by an investigation into the chemistry of the body has yet observed the organic processes that give rise to an obsession or a scrupulous tendency?

If, on the other hand, we are to base our theory on observed facts, we must limit ourselves to the theory of psycho-physical interaction, which states that bodily states can influence mental (as in toxæmia), and that mental states can affect bodily processes (as in hysteria), but that each can function independently without corresponding change in the other. This theory, which is much more in accordance with observed facts, permits us to assume that there are *psychogenic* diseases, disorders of mind and of body originating in mental disturbances. This assumption has been of the greatest value in the treatment of so-called 'functional nervous disorders'. Approached from the physiological side and treated as though their origin was physical, they have yielded but little to treatment; treated as psychogenic, by psychological means, they have responded splendidly to treatment.

One method of circumventing this difficulty as to the relation of mental and physiological states is adopted by many neurologists and physiologists, who take observed psychological phenomena, translate them into physiological terms, and then claim to have explained them! Gordon¹³ says: "It is time that the 'new psychologists' were reminded that they have yet to explain their theories in terms of the influences of biochemical changes on afferent end-organs, neurone patterns, efferent end-organs, and muscular and glandular activities". This, after all, is hardly the task of the psychologist, but of the physiologist. Gordon proceeds: "We may suppose that when a given stimulus activates a certain collection of neurones (an engram), that engram is modified by the activation; that such engrams will include neurones of the vegetative nervous system as well as neurones in the central nervous system; that if the spread of activity through the central nervous system neurones is for any reason interfered with, the activity will tend to spread in the vegetative neurones, etc.". . . By this means he proposes to "explain various neurotic phenomena". This so-called explanation was long since exposed by Janet. The 'observed facts' in these cases are psychological facts, mental facts, and merely to translate them into physiological terms is not to 'explain' them. The physiological explanation given is, after all, nothing more than a supposition, and at best it merely explains the mechanism of thought, not its cause.

McDougall¹⁴ has given us what is perhaps the best account of the relation of functional to organic disease. "The human organism", he says, "has to work under varying environmental conditions, and functional disorders arise when the environmental changes demand adjustment which exceed the organic power of self-regulation". He therefore holds that "the claim of functional diseases to a place of equal importance with the organic diseases must be fully realized".

OBSESSIONS AND PHOBIAS.

With the passing of the war, interest in purely hysteric manifestations (paralyses, anesthetics, etc.) is also passing, and attention is becoming directed more towards the obsessive neuroses and anxiety states. Indeed, it almost appears as if fear were coming to be regarded as the basic fact in psychoneuroses.

Janet has distinguished 'les agitations émotionnelles' thus: "So far as they are precise, systematic, attached to a specific idea, they are *phobias*; so far as they are diffuse, without relation to a determined thought, they constitute *les angoisses*".¹⁵ The cause of these conditions, like all psychasthenias, he regards to be a "lowering of psychological tension,"¹⁶ this lowering of tension being due to organic illness, fatigue, and—less generally—emotional causes.

Freud says:¹⁷ "We are convinced of the quite central positions which the problem of anxiety fills in the psychology of the neuroses. Anxiety comes to the forefront of our interest in the problems of the neuroses". There are, of course, many conditions in which anxiety is conspicuously absent, such as conversion hysteria and obsessive acts, but anxiety lies at the base of all these. The anxiety affect Freud regards as a reminiscence of the experience of birth—the first anxiety state arose on the occasion of the separation from the mother".¹⁸ The phobia, in Freud's view,¹⁹ is due to the transference or substitution of the symptom for repressed sexual gratifications; the fear being directed towards the impulses within us instead of to dangers without. Jung²⁰ also looks upon fear as "the expression of an introversion which has become neurotic". We may distinguish the use of the term *fear* for an ordinary objective fear of danger, *anxiety* for an objectless fear (so characteristic of anxiety states), and *phobia* of a projected fear (such as fear of a pillar-box).

T. H. Thomas²¹ maintains that the phobia is invariably present and fundamental in every psychoneurosis, and since fear can be considered in physiological terms, offers us a basis for explaining the psychoneurosis on a physiological basis. "Fear is the feeling which results from a state of physiological disharmony. This disharmony arises in consequence either of the inhibition of one of the individual's instinctive processes or the mutual interference of two or more; when an instinct is inhibited, the result may be anger or fear. Anger obtains when the individual's wish to assert himself is only partially inhibited. Total inhibition leads to fear—or the more compound emotion anxiety." When, however, he states that this fear is fear of the environment (and not, as Freud held, to fear of one's own impulses), he appears to be contradicted by facts. A patient of the writer's had a fear of poisoning her husband and child; whilst under treatment, owing to a mistake over the telephone, she gave her child an overdose of a hypnotic (nine grains instead of five), but in actual fact she was less disturbed by this real danger of poisoning than she was by the imagined fear. Indeed, for the time being her phobias disappeared, which tends to support Freud's explanation that the phobia corresponds to a 'repressed wish', which in some way was satisfied by this mistake.

Millais Culpin²² seems to support this view of the phobia as the fundamental element in the psychoneuroses, and that "the psychoneurotic symptom never stands alone". Thus a hysteria cannot be cured by a direct attack upon it, though it may with advantage be vigorously checked at the outset and thus maintain the patient's power of resistance against this and other symptoms which would otherwise follow. Culpin has drawn an interesting parallel between the obsession and the phobia: "An obsession, like a phobia, is felt to be inadequate and unreasonable, and the two are often found to work together. Sometimes a phobia is the reverse of an obsession; a fear of knives may, when viewed from another aspect, prove to be a suicidal obsession: "Fear and desire, phobia and obsession, are to one another as the obverse and reverse of a coin".

TREATMENT.

It is a healthy sign that the literature of the year has concerned itself much more with psychopathology than with treatment, for the latter depends on a right conception of the former. Perhaps the most important contribution on therapeutics proper is that of Yealland²³ in his treatment of hysterical fits. He finds that during a fit the patient is able to react to external stimuli, and that during the paroxysm he can be made to realize that consciousness is retained from beginning to end. In this way the physician is able by re-education to develop the patient's power of restraint or inhibition. Yealland starts by reproducing the fit to order. "This is effected by persuading the patient to do so, or in case of difficulty the patient is commanded to close his eyes tightly and to make his body tense; while he lies on his back on a couch he is ordered to raise his legs against the demonstrator's hands, which are placed on the patient's ankles. In the majority of cases an attack is readily reproduced by the latter method". An attack always seems to follow a certain state of tone of the muscles which is created by simultaneous concentration of agonists and antagonists. It is proved that such a fit is not necessarily the result of suggestion, for "the fit may be produced simply by the order to raise the lower limbs". Though Yealland does not suggest an explanation of this procedure, it recalls Breuer's²⁴ method of abreaction, the emphasis, however, being placed not upon the emotional element, but merely on the linking up of the dissociated processes in consciousness. Apart from this procedure as a method of treatment it has diagnostic value. If we can produce a fit to order, we may assume that the fit is not idiopathic epilepsy; and if we can produce it so easily, it will provide a most valuable means of diagnosing hysteria and epilepsy.

The 'Occupation Cure' is a very old-established one for neurasthenia; it was largely employed during the war, and is advocated by Brock²⁵ as a prophylactic measure. "Above all, each of our patients must get to work and produce something". In mild cases this is found to be very effective, but Brock's form of treatment is of little value in severe cases, where the whole personality is absorbed with its own internal problems, and with an attempt to solve them. In such cases, to put upon the patient's mind the extra strain of occupationary activity is to invite disaster, and to 'interest' them is impossible, as their minds are already too interested in their ailments. After all, many patients (doctors for instance) may be fully occupied in work in which they are interested, and yet break down.

Sir Maurice Craig²⁶ emphasizes the other side in insisting on the Rest Cure. He quotes Crile and Lower, that there is no distinction between emotional shock and shock produced by other means. In both cases there is exhaustion in the brain-cells, liver, and adrenals, the conditions being due to intracellular acidosis. Each form of treatment—occupation and rest—is applicable in special cases, which need to be distinguished. Fatigue and neurasthenia may result from exhaustion, whether of body as in toxæmia, or by emotional strain or shock. There is thus a physiological basis for the 'rest cure'.

But there is also a class of patient, as the reviewer has shown elsewhere,²⁷ whose fatigue is caused, not by expenditure of energy, but by stagnation and boredom; they lack a purpose in life, an outlet for their energies. Such patients require expression rather than rest. There is another psychological basis for the 'occupation cure'. Feelings normally give rise to emotional expression; if the emotional expression is thwarted, it is thrown back on itself and gives rise to the excessive feelings characteristic of the hysteric. If an emotional outlet can be found, the morbid feelings are relieved. Sentimentality and emotionalism arise from lack of healthy emotional expression. In such

cases, then, a rest cure is obviously futile; many patients are made distinctly worse by Weir-Mitchell treatment. They need a healthy occupation as the most adequate form of cure.

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PUBLIC HEALTH WORK, GRANTS-IN-AID IN.

Joseph Priestley, B.A., M.D., D.P.H.

In these days when the very strictest national economy is needed, the eyes of the economists have become fixed upon public health administration, with the result that a process of 'marking time' has resulted, and all endeavours are now concentrated upon getting a maximum output from existing machinery, without any new or increased plant being allowed to be supplied. There is something to be said for this principle; but it must not be pushed too far, and must certainly not be pushed so as to lessen efficiency in public health administration. Health is wealth, and what may appear to be extravagance to-day in preventive medicine work will prove, in the future, to have been the strictest economy. The opposite is also true. Economy applied to public health work now may prove to have been the greatest extravagance. The ordinary taxpayer or ratepayer may not be able to appreciate the point of view of the medical officer of health; but a cabinet minister is different, or even an ex-cabinet minister. He ought to be sufficiently expert to see eye to eye with the medical officer of health. The same applies to all members of Parliament, who represent the ordinary taxpayers or ratepayers. A grant-in-aid for public health purposes is not a 'money-spending device': it is a preventive measure. This argument applies especially to those branches of medical officers' administrative methods known as 'maternity and child welfare' and 'school medical inspection and treatment'. Milk assistance schemes, inaugurated under the Minister of Health's Milk Orders and the Maternity and Child Welfare Act, are also cases in point, showing the need for generous treatment in administration at the hands of the authorities concerned—a condition that is only obtainable by means of grants-in-aid. The grant-in-aid from a Government department is a stimulus, and a most useful stimulus, to progressive and well-administered sanitary authorities. It is a fertilizer to the municipal plant, and, as such, is invaluable. Sanitary (public health) and destitution (Poor-law) administration must be kept separate. A mother (expectant or nursing) and a child (and the same applies to a school child) may be 'necessitous' cases from the point of view of nutrition and quite irrespective of a 'Poor-law necessitous' condition. The first is a question of the public health; the second a question of the poor-law.

Grants-in-aid are more needed now than ever before in public health and preventive medicine administration, and economy in connection therewith may prove extravagance—the greatest extravagance—in years to come. The nation's health must be preserved at all costs—even at the cost of substantial rates and taxes, if necessary. It is not only the death-rates that must be

reduced, but also the morbidity (or sickness) rates; as it is the latter that represent such a loss to the State through the industrial world. The country must get the best possible return for its expenditure, and unprofitable (from a health point of view) outlays must cease. Sickness and disablement are costly to the nation, a total material loss to England and Wales that is estimated by Dr. Fremantle, M.P., at £150,000,000 per annum. Should concentration be on the individual or on his environment? Clearly on both. No hard-and-fast rule can be laid down. Child welfare, venereal diseases, tuberculosis, etc., schemes are all on the 'individual' principle, but the great scheme of housing and town planning still remains, and that is on the 'environment' principle. To improve the feeding and other social conditions of the workers out of the Exchequer is one thing, but it must be done so as not to undermine initiative, and the moral and personal care of the individual. The whole question is a difficult one. Let us not fall between two stools. The improvement of the environment is of the nature of an *ideal*, and the people must be educated up to it. This education can only be effected gradually by teaching the people individually as is at present being done at the different clinics connected with maternity and child welfare, medical inspection (and treatment) of school children, tuberculosis, venereal diseases, dentistry, cleansing of verminous persons, etc. All this individualistic work must tell upon the people as a whole, and pave the way eventually to more general schemes for the improvement of environment by the abolition of slums and the adoption of a vigorous housing and town-planning policy.

PUERPERAL PELVIC INFECTION.

W. E. Fothergill, M.D.

MORTALITY AND MORBIDITY.—Writing on the "Fatality of Puerperal Fever", R. Dudfield,¹ Medical Officer of Health for Paddington, shows that the mortality of puerperal pelvic infection cannot be estimated by comparing the number of cases notified with the number of deaths registered. He gives a number of tables for 1921. The state of notification is shown by the following figures: In 10 areas there were 16 deaths and no notified cases; in 28 areas there were 114 deaths and only 63 notifications; in 28 areas there were 180 deaths and 180 notifications. Dudfield thinks that in assigning deaths to puerperal sepsis, the Registrar-General follows a rule differing from that adopted by the profession in diagnosing the disease. From the latest report of the Registrar-General, that for 1921, it appears that 2211 cases of 'puerperal fever' were notified in England and Wales during that year, and that 1171 deaths were assigned to 'puerperal sepsis'. This gives a mortality of 52·9 per cent, which is absurd.

[Notification of 'Puerperal Fever', with a capital P and a capital F, was made compulsory in the year 1898. It has always been a farce, as is shown by the comic-opera figures quoted by Dudfield. It has not done any good, and must have cost a good deal in time, trouble, paper, and printing in the last twenty-five years. The figures collected are not only incorrect and useless, but are positively deceptive. It is high time that the notification of puerperal pelvic infection was dropped. Yet some people seem to regard notification as perfect salvation, and continue to clamour for the notification of venereal disease. Seeing that there has been such complete failure to notify a comparatively respectable condition like puerperal infection, it is plain that even less success would attend any attempt to secure the notification of venereal disease. The notification by midwives of cases of high temperature after labour is a different matter entirely, and is serving a most useful purpose.]

If it is possible to make any just estimate of the fatality of puerperal pelvic infection, it can only be done by studying the published reports of the great

maternity hospitals where records are kept of 'morbidity' as well as of 'mortality'. Various arbitrary definitions of morbidity are in use; but the term roughly includes all fever during the puerperium. After excluding cases in which the fever is due to ascertainable causes other than pelvic infection, the remainder of the cases are regarded as caused by pelvic infection. The mortality due to this cause is always plainly stated. Taking the reports of several large British maternity hospitals for a number of years, it is possible to get the aggregate of a vast number of properly observed and recorded cases. This method shows that pelvic infection occurs in some 10 or 12 cases out of every 100 deliveries, and that 1 death occurs in every 25 or 30 cases of pelvic infection. In the out-patient or district work of maternity hospitals both morbidity and mortality are much lower than in labours within the walls of the hospitals. Why this should be so is a separate question. These figures were arrived at by a study of numerous reports published several years ago by English, Scottish, and Irish hospitals. No doubt the examination of more recent figures would give similar results.—W. E. F.]

A recent investigation of the case-records of a well-known American hospital has just been published by E. Eno,² who writes a "Study in Puerperal Morbidity" dealing with the case-records of the Department of Obstetrics of the Women's Medical College of Pennsylvania. There were some 7000 case-records available, but half of these patients were attended in their own homes, and are not so instructive as the 3500 treated and observed in hospital, the former giving, as usual, a very low morbidity and mortality. In the 3500 hospital cases, there were 300 cases of 'puerperal morbidity' due to pelvic infection, a percentage morbidity of 8.6. There were 10 deaths due to puerperal infection, exactly 1 in 30 cases. (Amongst the cases attended in their own homes there were no deaths from sepsis, and the morbidity was estimated at only 2 per cent.) Morbidity was nearly twice as common in primiparæ as in multiparæ, and it was increased by long labour and by repeated vaginal examinations. All operative procedures were followed by increased morbidity. There were bacteriological or definite clinical evidence of gonorrhœa in 36 per cent of the primiparæ and in 20 per cent of the multiparæ. The definition of morbidity used was "fever during the puerperium shown by a rise of temperature to 100° or more for three successive days or longer"; but in this study cases were ruled out if a non-obstetric cause of the fever was recorded.

R. A. Johnston and R. S. Sidall³ ask if the usual method of preparing patients for delivery is beneficial or necessary. Their 'usual method' is as follows. The nurse shaves the pubic hair, scrubs the external genitalia and inner sides of the thighs with green soap and water, and pours sterile water, alcohol, and a weak solution of bichloride of mercury over the vulva and adjoining area. Temperatures are recorded every four hours, and, if an elevation of 100.4° or above occurs on two successive days, excluding the day of delivery, the puerperium is arbitrarily designated as febrile. The writers have analysed the histories of 1059 labours within the Johns Hopkins Hospital, excluding abortions, Cæsarean sections, post-partum admissions, cases of intercurrent disease and localized infection outside the pelvis, and eclampsia. Operative delivery doubled the morbidity. Vaginal examinations increased it from 16 per cent to 22 per cent. Perineal lacerations did not increase it at all. Premature rupture of the membranes increased it from 17 to 23 per cent. It appeared that in every hundred spontaneous deliveries there were 19 followed by febrile puerperium, and there was very little hope of reducing this morbidity. The interesting point is that in 44 consecutive cases routine preparation for labour was purposely omitted, and only 4 of the women became febrile. This gives a morbidity of only 9.1 per cent. In view of this, routine ante-partum

preparation was omitted in every other patient for a series of 389 cases. The prepared had a morbidity of 16·3 per cent, while the unprepared had only 12·4 per cent. Using the whole material, 1207 prepared patients had a morbidity of 18·7 per cent, while 237 unprepared had only 11·8 per cent morbidity.

[It is not at all surprising to learn that scrubbing the external genitals increases the incidence of puerperal pelvic infection, especially if it is followed by the use of irritating antiseptic substances. More than one consulting obstetrician has noted, through years of observation, that in most cases of pelvic infection the nurse or midwife is very proud of the quantity of lysol she has used before, during, and after the labour. It is probable that plain soap and water, or domestic cleanliness, is a great secret of success in the management of normal labour.—W. E. F.]

TREATMENT.—B. P. Watson⁴ asks if the treatment is always in conformity with what we know of pathology and of infections in general. Applying this general knowledge to the subject in question, he finds that the lesions met with clinically and post mortem in puerperal sepsis are: (1) A localized surface infection of the mucosa; (2) A spreading infective lesion of the general surface of the mucosa, often with extension to the tubes; (3) An inflammatory infiltration of the uterine wall, sometimes with abscess formation; (4) An inflammatory effusion in the cellular tissue of the broad ligaments, with or without pus, and usually accompanied by tubal inflammation, with or without pus; (5) A general peritonitis; (6) A septic thrombophlebitis of the pelvic veins, with or without emboli, and with or without bacteræmia; (7) A general bacteræmia. In any case there may be a combination of these conditions.

As to investigation, the first thing to do is to exclude extragenital sources of fever, by examination of heart, lungs, kidneys, breasts, and other organs. In 2096 cases confined at Burnside Maternity Hospital, Drs. Watson and Scott found 476 cases of fever during the puerperium. In 20 of these the cause was extragenital, in 50 there were definite pelvic lesions, and in 406 no definite lesion was found. All the cases recovered perfectly without any treatment. [Yet puerperal pelvic infection is often said to have a high mortality.—W. E. F.]

The pelvic organs are to be examined by inspection and gentle bimanual palpation, and here the investigation should cease. Nothing is to be gained and much harm may be done by exploring the uterine cavity. If a piece of placenta is retained, Dr. Watson holds that it is wrong to curette or introduce the finger or any other instrument. He also condemns the intra-uterine douche. In the infected uterus, he says, the cervical canal always remains patulous and drainage is assured. It may be helped by the **Fowler Position** and by the use of **Ergot**, **Pituitrin**, and **Quinine**. If there is foetid discharge a gentle **Vaginal Douche** may be used. To this line of treatment the great majority of puerperal infections will yield and the patient will make a perfect recovery. If extension takes place, a cellulitis should be evident on palpation in three or four days; a pus tube a little later. Cellulitis generally resolves in a few weeks. A few cases undergo suppuration, and the pus must be evacuated either through the vagina or, extraperitoneally, through the abdominal wall. In the case of pus tubes, removal should not be undertaken until the temperature has remained normal for some time; but in certain cases it is necessary to evacuate pus by posterior colpotomy during the continuance of the febrile state. Colpotomy and drainage may also be used in cases of peritonitis. Thrombophlebitis has often been successfully treated by ligation of the ovarian or common iliac veins.

If the temperature remains high and there are not present in the pelvis physical signs to account for it, there was probably a blood infection. A

surprising number of febrile puerperal patients had positive blood cultures at one time or another. Most of these recovered completely without any special treatment. Various forms of Intravenous Medication have been used, and there have been recoveries after all of them. But many recover without drugs or serums, so that the value of these measures cannot be assessed.

Watson's remarks on treatment after full-time delivery apply equally to infections occurring after abortion, complete or incomplete. He makes it a rule never to curette the uterus or carry out any intra-uterine manipulation if the patient has a temperature, unless there is severe hæmorrhage. In incomplete abortion a mass felt projecting through and blocking the cervical canal may be very gently removed.

Puerperal Scarlet Fever.—Writing on "Fevers of the Puerperium", E. Thorpe⁵ deals with puerperal scarlet fever, both uncomplicated and complicated by puerperal sepsis. These conditions he has observed personally as Assistant Medical Officer of Health in Suunerland. He found early isolation necessary to prevent the spread of infection to women unprotected by previous attack. When sepsis complicated scarlet fever, the sepsis was a separate infection; there was no evidence that scarlet fever would cause puerperal sepsis. The double infection was traced, and separate onsets were easily made out. Two new-born infants showed no evidence of scarlet fever while in hospital, three showed evidence of infection in utero, and the remainder developed the disease after birth, the rash appearing in from a few hours to five days after birth. Pure puerperal scarlet fever ran a fairly mild course and had no mortality, the mothers generally breast-feeding their babies. The cases complicated by sepsis were much more serious, their mortality being 66 per cent. The writer notes that very few cases of puerperal sepsis are notified in comparison with those which undoubtedly occur. He favours hospitalization of all these cases at the earliest moment. All rashes should be considered septic until proved otherwise; morbilliform rashes are almost certainly septic in the puerperal woman; scarlatiniform rashes are frequently present, but no diagnosis of scarlet fever should be made without the presence of the injected throat and double rash.

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PULMONARY EMBOLISM. (See EMBOLISM.)

PULMONARY TUBERCULOSIS. (See TUBERCULOSIS, PULMONARY.)

PURPURA.

Herbert French, M.D., F.R.C.P.

Montague Dixon¹ describes four cases of purpura which he has treated successfully by Injecting Human Blood. He injected from 2 to 3 c.c. of blood into the gluteal muscles. The first case, a boy of 4, had two such injections; the second, a man of 60, also had two; the third, a girl of 3, one only; while the fourth, a girl of 6, had two. In all the results were most successful, and there were no recurrences.

Larrabee² advocates repeated Transfusion in these cases. He considers that the transfusions should be both large in amount as well as frequent, and that unmodified blood as opposed to citrated blood should be given, so that for his series all the transfusions were given by the Kimpton-Brown method in paraffined tubes.

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PYLORUS, CONGENITAL HYPERTROPHY OF.

Frederick Langmead, M.D., F.R.C.P.

So much attention has been paid in the literature to this condition that it is now the exception rather than the rule for it to go unrecognized. There remain, however, many points still to be elucidated, for as yet there is no consensus of opinion as to its cause, nor is there general agreement as to the proper method of its treatment. Though it has been recorded in the fœtus, the pyloric obstruction cannot ordinarily be ascribed to congenital malformation, for the symptoms of obstruction rarely date from birth, and may be postponed for some weeks, even for three months, as occurred in an exceptional case of the reviewer's. Moreover, there may be periods of complete freedom from symptoms though the thickened pyloric ring remains; and the symptoms may be abolished permanently by medical measures alone. Possibly some degree of hypertrophy of the circular muscle is actually congenital but is accompanied by symptoms only when an added spasm occludes the pylorus, or rather prevents its opening during the periods when the stomach should normally be emptying its contents into the duodenum. It is usually held now, that infantile pylorospasm and congenital hypertrophy of the pylorus are manifestations of the same morbid entity, in which both are usually present, though in varying proportions. At one end of the scale may be exceptional cases of hypertrophy, severe enough to cause organic obstruction; at the other end cases of spasm with symptoms of obstruction but without hypertrophy. In by far the greater number of cases, however; both spasm and hypertrophy are present, the incidence of symptoms being more related to the occurrence of the spasm than to the degree of the muscular overgrowth.

G. F. Still,¹ in a notable contribution to the literature of the subject, has written of his personal experience, extending over twenty-four years and comprising no less than 248 cases, 210 of which were of boys, 87 of girls, whilst in one case the sex was not recorded. Fifty per cent of the infants were first-borns. There were four instances of two cases occurring in the same family. While not denying the possibility of the spasm or the hypertrophy being congenital, he thinks it more probable that what is congenital is some "lack of stability", as he puts it, "in the harmony of gastric and pyloric relaxation and contraction, so that the child starts life with a machine which, although able to work passably well for a few weeks, is certain soon to get out of order". The age of onset of symptoms was noted in 195 cases. Taking vomiting as the first symptom, this appeared as follows :—

Week of Onset	No. of Cases	Week of Onset	No. of Cases
1st ..	30	6th ..	6
2nd ..	38	7th ..	1
3rd ..	57	8th ..	7
4th ..	35	9th ..	1
5th ..	19	12th ..	1

As he points out, it is the combination of vomiting, constipation, and wasting which, when they occur in an infant under three months of age, should always suggest the possibility of congenital hypertrophy of the pylorus. The vomiting is variable in its incidence and frequency, sometimes beginning almost insidiously, sometimes abruptly, being sometimes infrequent with only gradual loss of weight, sometimes continuous with rapid wasting. Periods of freedom from vomiting may lead erroneously to the diagnosis being suspect. At first the vomit consists of food only; later, catarrhal changes in the mucous membrane

cause the appearance of mucus or even brown shreds or clots of fresh blood, while occasionally the vomit contains bile. Change in diet is often followed by improvement, although temporary, a response to treatment which may obscure the diagnosis. However, as Dr. Still rightly emphasizes, the diagnosis in this disorder is not a matter of opinion. Either the evidences are present or they are not. If the signs are present, the diagnosis is sure; if absent, it cannot be made, though it may be left in abeyance pending further examinations. The requisite signs are visible peristalsis of a forceful kind, combined with a pyloric tumour, small, barrel-shaped, and hard, which through the abdominal wall gives the impression of varying in size from the thickness of a lead pencil to that of a hazel nut. It is felt far back against the right side of the vertebral column, about 1 to 1½ in. above the umbilicus. It disappears when the pylorus relaxes, being obvious at one moment and again not felt. Gentle kneading may render it palpable. Much patience is often necessary, and success may not attend the first or even second examination; but if sought in the proper way, the tumour is to be felt in practically every case. Dr. Still felt it definitely in all but two of his 248 cases. It is always advisable to have the infant fed during the examination.

In 232 cases the result of treatment was recorded, and showed 156 recoveries and 76 deaths. Seven were *in extremis* when first seen. Excluding these, 225 infants remain, of whom 156 recovered and 69 died. The figures, of course, cover a period when surgical treatment was regarded as a desperate resource. The usual and unexplained difference in the results between private and hospital cases is again shown, there being 113 recoveries and 14 deaths in private cases, and 43 recoveries and 55 deaths in hospital cases.

Complete recovery may follow no treatment other than painstaking and efficient regulation of the Feeding, generally in the direction of reducing the food to small quantities at short intervals. Six of the 156 recoveries were treated in this way, but he regards the chance of recovery by this treatment as extremely small.

Many successes attend Gastric Lavage, and of 78 cases treated only in this manner, 43 recovered and 35 died. To these must be added many cases where lavage was tried but did not procure sufficient improvement to justify postponing operation. It is not without drawbacks. Some babies become so exhausted by it that it has to be abandoned, whilst in others the gastric mucosa becomes irritated and bleeds. It has to be continued for an average of twelve to sixteen weeks, often at first twice daily, before it becomes unnecessary in cases which are cured by it. With all its limitations it has achieved enough success to justify its retention as a method of treatment which may be the best in particular cases. When the weight falls only slowly and a good deal of food is passing through the pylorus, lavage may be tried if controlled by daily weighing. Should the weight continue to fall, even for a few days, operation should not be postponed. The decision whether operation should be performed forthwith or lavage be given a trial is influenced by the possibility of obtaining a surgeon with experience of the disorder. When the infant is breast-fed he thinks it usually the wisest course to proceed at once to operation, so that after an interval of only forty-eight hours the infant may continue the breast milk. The disturbances entailed by lavage generally lead to loss of the breast milk, which materially diminishes the chance of successful surgery, if it becomes necessary.

The choice of Operation is then considered. Pylorotomy, pyloroplasty, gastro-enterostomy are now abandoned. In 2 of the cases gastro-enterostomy was done, and both recovered; but in all the rest of the 189 cases which were operated upon, the procedure adopted was either forcible dilatation of the

pylorus, or, in the last five years, the Rammstedt operation. The results of the various kinds of treatment are thus summarized:—

Method of Treatment	PRIVATE CASES.		HOSPITAL CASES	
	Recovery	Death	Recovery	Death
Simple feeding ..	5	0	2	1
Lavage	24	6	19	29
Gastro-enterostomy ..	2	0	—	—
Forcible dilatation ..	24	6	12	16
Rammstedt	8	2	10	9

The Rammstedt operation is simple and rapid, and has become the accepted surgical procedure, but it is by no means free from danger. The deaths in the fatal cases were all due, except in one instance, directly to the operation, either by bleeding into the peritoneal cavity, by shock, or by collapse within a few days. Whatever the treatment adopted, the recovery, when obtained, appears to be complete and permanent, the children becoming healthy and strong.

A valuable paper has been written by L. G. Parsons and S. G. Barling,² who have examined critically the results of treatment in their cases and have inquired into the nature of the disease and some of the symptoms. It is based upon an analysis of 94 cases, of which 36 were treated by medical means, 8 by gastro-enterostomy after failure by medical measures, and 50 by Rammstedt's operation. The results by medical treatment alone were very unsatisfactory, and they consider that relief of the obstruction by Rammstedt's operation, preceded and followed by a careful medical régime, offers the best means of reducing the high mortality of the disease. The operation, by allowing the redundant mucous membrane to bulge, temporarily abolishes the sphincteric activity of the pylorus. If the cases be diagnosed early, they believe that by this treatment the mortality may be reduced to 20 per cent. This expectation may be compared with Dr. Still's figures for private cases where forcible dilatation was employed, in which the mortality was 7·5 per cent.

A new investigation conducted by them has been the examination of the gastric function in so far as it can be computed by fractional test-meals, and they find that the gastric contents show high rennin content, high free acidity, and high total acidity in the resting stage, delayed emptying, and absence of duodenal regurgitation. These writers promise a fuller report later of the chemical investigations, when perhaps they may find cause to modify their statement with regard to duodenal regurgitation, since bile sometimes appears in the vomit. Against the hyper-adrenalism hypothesis of Gray, Pirie, and Reynolds they take a firm stand, and show that chemical analysis of the stools negatives the suggestion that the patients are suffering from pancreatic insufficiency. [It will be remembered that these authors suggested that the diarrhoea which may follow operation and is a common cause of death is due to pancreatic insufficiency, ascribed to the antagonistic action of the pancreas and adrenal glands.—F. L.]

Among the drugs which have been advocated from time to time in this disorder is *Atropine*. Sidney V. Haas³ regards it as practically a specific, though others have weighed it in the balance and found it wanting. He looks upon pyloric stenosis as an advanced degree of pylorospasm, itself a single manifestation of a general hypertonic state due to overaction of the vagus. The drug may be given by the mouth, but in severe cases should be administered hypodermically until vomiting is controlled. The dose recommended is 1/100 gr. at each meal up to a maximum which either controls symptoms

or produces evidences of its physiological effect. The largest dose administered was $\frac{1}{2}$ gr. in twenty-four hours. The paper is based on more than 40 cases, of which he reports that one died suddenly, one ceased treatment, and all the others recovered, though at least 20 per cent had been advised that an operation was required. [These results differ so completely from those of others that it is regrettable that only one case is described in detail, and that in that particular case no pyloric tumour was felt, while tetany—a most unusual symptom in pyloric stenosis—was present.—F. L.]

Leonard Findlay⁴ favours medical treatment from his experience of 80 cases, 62 in hospital practice and 18 in private. Of the hospital cases, 12 were treated surgically and 3 only recovered, while 50 were treated medically and 19 recovered. Of the private cases, 6 were treated surgically and 3 recovered, while 12 were treated medically and 10 recovered. The operations performed were Loreta's and Rammstedt's in most cases, gastro-enterostomy in one. His conclusions are: (1) Spasm of the hypertrophied pyloric muscle is the most important factor in causing the symptoms; (2) The results of treatment are invariably better in private than in hospital practice; (3) Medical measures give as good results as operation, if not better; (4) Operation should probably be reserved for the youngest cases and for those seen soon after the onset of symptoms; (5) The great danger to be avoided in any form of treatment is under-feeding; (6) The infant with this disorder requires constant and individual care.

I. H. Tumpeer and M. A. Bernstein,⁵ by injecting paraffin into the pyloric ring, have reproduced experimentally the anatomical condition of hypertrophic pyloric stenosis in six dogs, but found that the clinical picture of the disease does not follow. They infer that the symptoms are not due to the anatomical obstruction alone.

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QUINIDINE IN HEART DISEASE.

Drs. C. Lian and L. Pollet.

(Translated by Carey F. Coombs, M.D., F.R.C.P.)

Administration in Auricular Fibrillation.—The following remarks may be read as complementary to those of last year.

There has been much discussion as to the propriety of using cardiac tonics before or with quinidine, and most clinicians advise that digitalis be given before quinidine. Lewis's researches,¹ however, have led him to use the two drugs simultaneously, the action of digitalis on *a-v* conduction serving as a check on the tachycardia which may be provoked by quinidine. None the less the fact remains that there is a certain antagonism between the two drugs, and that is why many writers condemn their simultaneous use. Further, there is a definite tendency to give digitalis neither before nor with quinidine, and, in fact, to give it only when, following the use of quinidine, the rate of the heart is increased. The use of digitalis immediately before quinidine is chiefly based on the fear of the depressing action of the latter on the cardiac muscle, a fear which, in our opinion, has been exaggerated. We have never known quinidine increase cardiac insufficiency; on the contrary, it always brings about improvement even when fibrillation has persisted in spite of massive doses. Nevertheless, our clinical experience teaches us that in patients with easily provoked dyspnoea, with or without passive hyperæmia, it is always well to improve the state of the patient by digitalis before instituting treatment by quinidine.

To sum up, our view is that the right course is: (1) In the absence of marked

dyspnoea to give quinidine forthwith; (2) In cases of marked dyspnoea, with or without passive hyperæmia, to give several short courses of digitalis first, and begin quinidine five days after the end of the last course; (3) To reserve the use of digitalis during or after quinidine treatment for cases in which this latter has provoked or perpetuated tachycardia.

Our opinion on the frequency of permanent good results has been confirmed by many writers, as well as by further personal experience. Thus, Clark-Kennedy² had 28 successes, 21 of which were permanent; Burwell and Dieuaide³ 8 out of 14, Hamburger and Priest⁴ 5 out of 11; Viko, Marvin, and White⁵ 25 out of 75; Meyer⁶ 7 out of 10; Sebastiani⁷ 9 out of 10. Our own experience so far⁸ is as follows: Out of 85 patients treated, 14 were successful; of these, 2 have been only a short time under observation, in 3 the success was transient only, and in the remaining 9 durable. We think, therefore, that one may look for one-third of failures, one-third of good results, and one-third of transitory successes from the use of quinidine. To get permanent results, however, there must be some plan for persistent administration of the drug. This may be achieved either by alternating medium doses of quinidine with small doses of digitalis, as we are accustomed to do, or by daily administration of medium doses for a period of months. Our experience shows that one may, as a rule, expect a definite decrease in the subjective symptoms following the use of quinidine, failure or aggravation being the exception.

Accidents are rare. Several new cases of respiratory paralysis have been recorded. After nine doses of .2 grm. in Cordier's⁹ case, a total dose of 2.8 grm. in three days in Reid's¹⁰ case, the patient had a sudden attack of stupor with cyanosis, sweats, and apnoea, lasting three or four minutes. There were altogether four or five of these attacks in two days. Recovery followed this accident, which was alarming rather than serious. Clark-Kennedy reports a case of sudden death, the cause of which was not revealed by autopsy; there was no embolism.

Embolism, as we said last year, constitutes a drawback to any active mode of treatment. In this connection it is noted that Viko, Marvin, and White¹¹ compared 452 cases of fibrillation treated by quinidine with 22 cases not so treated, and found the percentage of embolism the same in the two series. Lévy¹² also treated 50 cases of fibrillation, half of them by quinidine, half by digitalis; among the former there was only one case of embolism, among the latter there were five. Further, there are many clinicians who have seen no case of embolism among patients treated with quinidine. The writer (C. L.) saw recently a woman who had two transient attacks of hemiplegia lasting several hours, at an interval of several days; but these occurred during a period of polyarticular pain with slight fever, and, as the patient had been taking quinidine for about two years, it seems improbable that this was the cause of the attacks. At all events we may recall the contra-indications stated last year to the use of quinidine: profound cardiac insufficiency, *a-v* block, and a history of embolism.

Clark-Kennedy considers that the conditions favourable to its use are as follow: (1) Recent onset of fibrillation (less than a year); (2) Rheumatic heart disease rather than cardiosclerosis; (3) Mitral stenosis rather than aortic insufficiency; (4) Little or no evidence of cardiac failure (cases where digitalis has done no good are unfavourable); (5) Cases where cardiac breakdown accompanied or followed the onset of fibrillation (cases where definite cardiac failure appeared a long time before fibrillation are unfavourable); (6) Marked subjective symptoms and cardiac irregularity; (7) Middle age.

There is no doubt that it is of vital importance to treat auricular fibrillation from its first onset; any delay in instituting treatment will certainly be regretted.

In Auricular Flutter and Paroxysmal Tachycardia.—Last year we noted a few facts regarding the use of quinidine in these conditions. Several fresh records have been added.

Parkinson and Nicholl¹³ obtained the following results: four patients were treated outright with quinidine, in one of whom the normal rhythm was restored; in three others digitalis was subsequently given, provoking in two a transformation into persistent fibrillation. In their fifth case of flutter, digitalis provoked fibrillation, which was then converted by quinidine into normal rhythm. Gallavardin and Gravier¹⁴ had three successes out of four patients treated. The writer (C. L.)¹⁵ succeeded in stopping auricular flutter in one case after five days of treatment by quinidine sulphate, rising from .4 to 1 gm. per day; a previous attack lasting several months had been stopped by an intensive course of digitalis. We agree with the proposal of Parkinson and Nicholl that for such cases the following order should be observed in the use of the two drugs: (1) Quinidine; (2) If it fails, digitalis, which sometimes of itself restores the normal rhythm; (3) If digitalis changes flutter into fibrillation, return to quinidine to get rid of the fibrillation.

In *paroxysmal tachycardia* the following results have been obtained: Boden¹⁶ had recourse to intravenous injection of .4 gm. during the attack in 6 cases, with 4 successes; but this method is as a rule regarded as dangerous. F. M. Smith¹⁷ obtained his two successes by treatment given during intervals. Korns¹⁸ used quinidine in progressive doses, rising from 5 to 15 gr. daily, to get rid of arrhythmia consisting of frequent premature beats with long paroxysms of tachycardia. Gallavardin and Gravier got rid of attacks in a patient treated by quinidine given in progressive doses for repeated periods. Parkinson and Nicholl treated 6 cases with no success. In attacks of recurrent tachycardia not analysed by electrocardiography, the writer (C. L.) has used the following treatment between attacks for 13 patients: 2 to 4 tablets of .2 gm. of quinidine sulphate daily for several months, in series lasting two weeks, separated by five-day intervals. The results were good in 5 cases, passable in 3, and slight in 1. In all these cases attacks were sudden in onset and offset, lasting for several hours or even days, apparently not provoked by a definite cause; but there has been no opportunity of securing a graphic record during an attack.

In conclusion, where it has been possible to make an electrocardiographic diagnosis, we agree, as to flutter, with the advice of Parkinson and Nicholl detailed above. In paroxysmal tachycardia we suggest that when the minor measures usually employed at the onset of the attack, such as pressure on the eyeball, efforts at swallowing, deep breathing, etc., have failed, quinidine may be tried in doses of .4 to 1 gm. daily by mouth, to be stopped if there are signs of cardiac insufficiency. When electrocardiographic diagnosis is impossible, the lines of treatment sketched above may be followed if it be recollected that flutter occurs in long attacks of days, weeks, or months, with a speed not exceeding 180; while attacks of tachycardia are short, lasting minutes, hours, or days, and attaining a speed of 200 or over. Finally, whether electrocardiography is possible or not, quinidine should be given between the attacks in doses of .4 to .6 gm. for the first ten days of each fortnight for several months, digitalis being prescribed during the intervals if necessary.

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RADIOTHERAPY. (*See also* BREAST, SURGERY OF; ELECTROTHERAPEUTICS; THYROID GLAND, SURGERY OF; TONSILS, DISEASES OF; UTERUS; X-RAY DIAGNOSIS.)
C. Thurstan Holland, Ch.M.

Radiation Dangers.—In his presidential address to the Roentgen Society, Rolleston¹ reviews very fully the literature bearing upon the *acute constitutional symptoms* due to radiation. There is no doubt that with the advent of the very powerful modern apparatus, and with tremendous penetrating power—not only the rays from radium but also those used in hard X-ray therapy—with the length of exposure given to patients and the possible danger of prolonged exposure of operators, the question of constitutional results, as apart from X-ray dermatitis, burns, and so on, has become one of much importance. In discussing the onset of symptoms, it is pointed out that acute constitutional symptoms may come on either within a few hours or be delayed for as long as twenty days, and the suggestion is made that the cause of immediate symptoms, such as malaise, lassitude, nausea, vomiting, headache, and giddiness, is different from that which is responsible for the graver constitutional disturbances coming on much later. The author discusses the reports made by many radiologists on cases which have come under their individual notice, and compares and contrasts the various opinions put forward; much purely experimental work on animals is also reviewed from the point of view of its possible bearing on the effects which have been known to occur in humans. Summing up, it seems that the acute constitutional symptoms are due to a flooding of the circulation with proteins liberated by the destruction of cells. Experimentally it has been shown that this can certainly be due to damage to the mucous membrane of the small intestine: clinical evidence is compatible with this view, but also shows that destruction of cells in other parts of the body, such as large growths in the neck and in the mammary region, may be followed by acute constitutional symptoms. The patient's idiosyncrasy, rather vague as this influence may be, must be considered as a possible factor in the case. The paper concludes with some practical advice as regards treatment and prevention, and with a full bibliography.

Amundsen² has examined the *blood* of fifteen persons connected with an X-ray and radium institute. All showed definite lymphocytosis, and a complete account of the blood condition is given. It is noted that various people employed in the building, who did not work with either the X rays or the radium, showed lymphocytosis, as also two medical students who had worked in the institute for only one month. The author finds that in spite of such protection as is afforded by lead, rubber, and glass, the radiologist suffers to a certain extent from his occupation, and he has come to the conclusion also that the Coolidge tubes are very dangerous, and that the penetration of the gamma ray is astounding.

Smithies³ urges the necessity for caution in the employment of *high-voltage X rays* as a therapeutic agent. This paper deals with a case in which deep X-ray therapy was used for a supposed malignant disease of the spine—a diagnosis found later on to be faulty. The man died four months after the treatment, with acute adrenal insufficiency (the Addisonian syndrome); it was considered that the treatment was the direct cause of the acute collapse of the adrenal function, and doubtless the destruction of the chromaffin tissue.

The *chemical changes in the blood* following the radiation of tumours has been the subject of research by Loeper and Tonnet.⁴ Following certain dosages, which are stated, there is found (1) an increase in the total albumin of the serum, largely dependent upon a rise in the quantity of globulin; (2) an increase in the amino-acid content of the serum; (3) an increase in the total

lipoids of the serum, largely affecting the non-cholesterin portion; (4) an increase in the protein sugar, but not the free sugar. They conclude that the effect of repeated doses of X rays is to disintegrate the cells of cancerous tumours, and to liberate quantities of globulins, amino-acids, sugar, and lipoids, which then pass into the blood-stream and cause the changes that are observed.

Foveau de Courmelles⁵ discusses *anaphylaxis* to radiant energy, and considers that, from various observations which have been published, radio-anaphylaxis is an absolute fact. He points out that radiologists and manipulators of X-ray apparatus have all their lesions on the face and hands, where all lights sensitize them, and he considers that this is a striking confirmation of radio-anaphylaxis. It is suggested that means will be found to desensitize radiologists and to treat them with other radiations, and he quotes Bergonié as using radium with effect in X-ray injuries. This is an interesting and suggestive paper.

Russ⁶ writes on the effect of X rays of different wave lengths upon some animal tissues, and after an introduction discusses the physics, and especially the experimental methods, of measuring a radiation dose. There follows a section on animal experiments and the results obtained from observations on 300 rats, and the author concludes with a discussion of the results. His experiments were directed to prove that X rays of different wave lengths have a different action, and two main results obtained are that about six times as much short-wave-length energy as long-wave energy must be expended in a layer of skin in order to produce equal reactions; and that this factor falls to about 2.6 in the case of the tumour.

Colwell, Gladstone, and Wakeley⁷ have investigated the action of repeated doses of X rays upon the developing chick embryo. The experiments are described and the results summarized. The main fact arrived at appears to be that the rays were found to have an inhibitory effect in all cases, the tissues most affected being the surface ectoderm, the nervous system, and the eye; and that, within the limits of radiation investigated, the effects appeared to depend rather upon the total amount of radiation reaching the embryo than upon its quality or 'hardness'.

All these papers have a distinct bearing on the subject of radiotherapy, and, in addition to experimental work and research work of this kind, the question of measurement is of considerable, if not of paramount, importance. Three interesting papers are by Russ⁸ on the measurement of X-ray intensity and the necessity for an international method; Harlow and Evans⁹ on the quality of X rays produced by various high-tension generators and an incandescent cathode tube; and Martin Berry¹⁰ on practical X-ray measurement for medical purposes; and accompanying these papers is a report of the discussion and an account of some interesting apparatus.

Protection.—This is a subject of very great importance at the present time in view of the more modern methods of treatment, and of the powerful generating apparatus used both for this and for the purposes of ordinary diagnostic work. Pullin¹¹ has a useful paper in which all the fundamental principles involved are explained. He treats the subject from the point of view of medical practice and under the headings of: (1) Dangers from the actual beam of X rays; (2) Dangers from the high-tension electricity; (3) Dangers owing to inadequate ventilation. In Kaye and Owen's¹² paper on X-ray protection there is a mass of valuable material the result of experimental work which they have carried out. They include a description of the testing apparatus used, and also a table giving the 'lead equivalents' for a large variety of materials, i.e., the thickness of lead equivalent in absorbing power to unit thickness of the material. This paper should be useful to all X-ray workers,

and especially to those responsible for the organization and equipment of X-ray departments in hospitals.

[In consideration of this very important subject of protection, without in any way wishing to criticize adversely some of the recommendations and ideas prevalent, or in any way to minimize the dangers to X-ray workers, it appears to be necessary to point out to physicists and others, who do not use radiations for medical purposes and who have no first-hand knowledge of the exact requirements of an X-ray department in this respect, that, although theoretically and experimentally great thicknesses of lead, or lead-equivalent materials, seem necessary for absolute protection, in medical practice it is often found that if protection is carried out literally on the recommendations laid down, then the bulk and weight of apparatus is so great, and the apparatus is made so cumbersome, that it becomes inefficient and is not suitable for everyday X-ray work. It is well to aim at fool-proof protection in an X-ray department; that is the ideal; but it is useless if, in order to obtain it, efficiency of work is made impossible. In planning out the scheme of protection in any department—either hospital or private—the first principle to consider is under what circumstances is the individual piece of apparatus going to be used, and how is efficient protection to be best obtained without interfering with efficiency. If this is carried out with intelligence, it is quite possible to protect efficiently without overweighting the apparatus and making it clumsy and, to a certain extent, inefficient.—C. T. H.]

Gynæcology.—Knox¹³ discusses the whole question of X-ray treatment of gynæcological conditions. He lays great stress upon the estimation of the correct dose, and reviews shortly the physics and the biological reaction of radiations. The advantages and disadvantages of radium and X rays are contrasted; tables are added pointing out the contra-indications to treatment by either form of rays, and also the advantages and disadvantages as contrasted with operation. Emphasis is laid on the point that very expert knowledge is required if treatment is to be anything except mere guess-work and empiricism of the worst kind, and it is shown that the indiscriminate use of X-ray treatment is very dangerous. Knox is of the opinion, from his experience, that in all cases in which surgery is possible, surgery should be adopted, but that prophylactic X-ray or radium treatment is of very great importance. Ahader¹⁴ in the same journal sums up the position with accuracy, and his observations should be read with this paper.

Menorrhagia.—There are several papers of value on the treatment of severe uterine hæmorrhage by radium. Blacker¹⁵ lays down three conditions as suitable for its use: (1) Cases in which the bleeding is associated with the menopause; (2) Cases in which it is due to the presence of small fibromyomata in the uterus; (3) Cases in which it occurs in young women who present no signs of pelvic or general disease. He states that his results show that radium is a valuable and efficient method of treatment in all three classes, and he bases his conclusions on a series of 77 cases in which radium was used. The technique is described, and there is a considerable amount of very practical information. Two other papers are by Forsdike,^{16, 17} who has treated 65 severe cases in which ordinary measures had failed, and in some of which even curetting up to five times had been of no permanent use. This author describes some interesting research work made upon cats, and as a result he has formed the opinion that radium arrests uterine hæmorrhage solely through its action on the endometrium, and not, as was usually believed to be the case, through its action on the ovaries. Martindale¹⁸ reports the results of treatment on 20 consecutive cases of menorrhagia treated by intensive X-ray therapy. She gives exact details of the treatment carried out, which is a modification of the

Erlangen technique, and stress is laid on precision of dosage. The same technique is applicable, with further slight modifications, to the treatment of fibroids of the uterus. It involves only one, or at the most two, treatments, each lasting about two and half hours. Details of the results obtained—almost uniform success—are given. It is claimed that there are no risks to the patient, and its advantages over operation are that it is easy and comfortable for the patient, it involves no period of time off work, no unpleasantness of an anæsthetic, no long period in a nursing home or hospital, and above all there is no risk to life. This paper is one of the most useful of its kind, inasmuch as the technique is stated so very exactly and so very simply.

Deafness.—McCoy¹⁹ reports the results he has obtained in treating a series of cases of deficient hearing with X rays by Stokes' method, and he gives a description of this method, by means of which the rays are applied in turn to the region of the right ear, the left ear, the occiput, and the open mouth in a direction towards the pituitary gland. In 45 cases of chronic dry catarrh, purulent and residual catarrh, and osteosclerosis, he reports greatly improved 12, slightly improved 24, no improvement 9. Jarvis²⁰ records a case where a patient who was having X-ray treatment for an enlarged lingual tonsil, reported voluntarily, a week after the first dose, that the hearing of his right ear—which had been stuffy for ten years—had improved. As a result of this the treatment of other cases of deafness was undertaken, some with success, others without result; it was noted that patients in whom throat symptoms were a prominent part of the clinical picture responded best to X-ray therapy. Tinnitus aurium was considerably improved; the relief followed soon after the treatment. In a paper on *tinnitus aurium* treated by X rays, Kinney²¹ reviews the literature and describes the technique adopted. He has had one case of osteosclerosis in which hearing improved and the tinnitus was relieved; his other cases of this condition were uninfluenced. In cases of tinnitus from chronic otitis media there has been marked improvement in hearing and the tinnitus in 40 per cent. In these cases X-ray therapy should be added to the other methods of treatment usually adopted.

Polyglobuly.—In a paper on the X-ray treatment of primary polyglobuly, Rydgaard²² relates his own observations on three cases, and reviews the literature. Complete detail is given of the cases, together with the technique and dosage; in the aggregate the dosage must be fairly large, and treatment must be continued for a long time. One of the cases was cured by X-ray treatment of the spleen alone, the two others by treatment of the spleen and the bone-marrow; and as a rule treatment of the bone-marrow is necessary; in the majority of cases treatment of the spleen alone has no effect on the polyglobuly. The author considers that vigorous X-ray treatment of the bones is an effectual remedy for this disease.

Hyperthyroidism.—Groover, Christie, and Merritt²³ review the treatment of hyperthyroidism by all methods, and add a summary of their own experience with X-ray therapy. The subject is discussed from the three points of view of (1) the general management of the patient, (2) surgical treatment, (3) X-ray treatment. This paper is a very fair review of the whole question of management and treatment, and the conclusions reached are: (a) That a comparison of the results obtained by surgery and X-ray treatment indicates that the two methods are about equal in the percentage of permanent cures; (b) That patients with hyperthyroidism should first receive X-ray treatment, and have thyroidectomy only if they fail to respond; (c) That the general management of these cases is of the first importance, whether the ultimate treatment is to be by X rays or surgery.

Hard X-ray Therapy.—Many further papers have appeared during the past

year on the application of hard X-ray therapy, mostly in the direction of the treatment of inoperable malignant disease. Nothing which can be strictly said to be new has evolved; but it has become quite evident that the extravagant claims made for the so-called Erlangen treatment are not being established, and that the so-called 'lethal dose', to be administered as a knock-out blow at one sitting, is not the last word in X-ray therapy. In an interesting discussion on clinical results, Knox²⁴ indicates very fairly what can be expected from this line of treatment, and he advocates the dividing up of the total dose over six sittings, a method which he has found to be satisfactory, especially in breast cases. In this discussion he and Sampson Handley strongly emphasized the value of prophylactic post-operative X-ray treatment: the latter, as the result of his experience of fifteen years during which time practically all his breast cases had had such post-operative treatment. He also stated that almost all the superficial recurrences just under the skin which had occurred were in the few cases which, from one reason or another, had escaped the prophylactic course.

Pilger,²⁵ who is one of the staff at Erlangen, gives an account of the development of the work as it is carried out at this clinic. This is a first-hand paper, and not a description of the work as seen by others: the physics, dosimetry, methods of X-ray measurement, apparatus, technique, etc., are all reviewed. The method of applying treatment is described, and the importance of the preparation of the patient before treatment and the points to be observed after treatment is insisted upon. At Erlangen very great importance is given to both. Finally, the paper deals in a general way with results. Some results of deep X-ray therapy are given by Morton and Lee²⁶ in a paper in which they state that they have in the main based their technique on that of Wintz, of Erlangen. This paper is mainly the narrative of some fourteen cases admitted by the authors to have been selected as showing what can be done when the conditions are favourable. It is also admitted that what exactly constitutes 'favourable conditions' is not at the present time known, as in many cases in which they would have expected good results there has been disappointment, and some cases in which they have carried out the treatment purely as a placebo have done surprisingly well. Strauss²⁷ reviews the present-day position of the treatment of carcinoma by X rays. In discussing the 'carcinoma dose', the opinion is expressed that, although this has not been established, the attempt to establish it was the starting-point of a real advance in X-ray therapy. A considerable part of this communication is given up to a discussion on the methods of action of X rays, and a conclusion is come to that the dosage for the treatment of a primary tumour is altogether different from that which should be used for post-operative treatment: that whilst strong doses are necessary for the former, much weaker ones are needed to stimulate the resistance of the body, and that less penetrating rays are more suitable for the production of post-operative immunity.

¹ REFERENCES.—¹*Jour. Roentgen Soc.* 1923, 5 (abstr. *Brit. Med. Jour.* 1923, i, 1); ²*Tidsskrift for Den Norske Lægeforening*, 1922, Oct., 862 (abstr. *Brit. Med. Jour.* 1922, ii, 80); ³*Surg. Gynecol. and Obst.* 1923, 61; ⁴*Bull. de l'Assoc. française pour l'Etude de Cancer*, 1923, Feb. 103 (abstr. *Brit. Med. Jour.* 1923, i, 76); ⁵*Paris méd.* 1922, xxx, 292; ⁶*Proc. Roy. Soc. (B)*, 1923, 95, and *Lancet*, 1923, ii, 637; ⁷*Jour. of Anatomy*, 1922, Oct., 1; ⁸*Proc. Physical Soc.* 1923, June, 5b; ⁹*Ibid.* 9b; ¹⁰*Ibid.* 20b; ¹¹*Jour. R.A.M.C.* 1923, 198; ¹²*Proc. Physical Soc.* 1923, June, 33b; ¹³*Brit. Med. Jour.* 1922, ii, 678; ¹⁴*Ibid.* 695; ¹⁵*Lancet*, 1923, i, 421, and *Arch. Radiol. and Electrotherap.* 1923, July, 47; ¹⁶*Brit. Med. Jour.* 1923, ii, 409; ¹⁷*Proc. Roy. Soc. Med. (Gynæc. Sect.)*, 1923, June, 69; ¹⁸*Brit. Med. Jour.* 1923, ii, 411; ¹⁹*Amer. Jour. Roentgenol.* 1923, 203; ²⁰*Ibid.* 201; ²¹*Ibid.* 378; ²²*Acta Radiologica*, 1923, ii, 243; ²³*Amer. Jour. Roentgenol.* 1923, 385; ²⁴*Brit. Med. Jour.* 1923, i, 152; ²⁵*Arch. of Radiol. and Electrotherap.* 1923, May, 364 (abstr. *Lancet*, 1923, i, 115); ²⁶*Lancet*, 1923, i, 117; ²⁷*Deut. med. Woch.* 1922, xlviii, 1575 (abstr. *Lancet*, 1923, i, 553).

RECTUM, CARCINOMA OF.

J. P. Lockhart-Mummery, F.R.C.S.

A considerable number of papers on this subject have appeared during the last year, many of them accompanied by careful statistical inquiries into the results of the various operations performed. It is obviously very desirable to review our knowledge on the end-results of operation from time to time, and a careful analysis of the reported cases during the past year cannot fail to be of value to anyone who has to deal with these cases, as it is only by showing the results that can be achieved that we can be in a position to advise our patient as to the best method of treatment.

A good deal of interest is centred round the question of whether the growth remains localized to the bowel wall during the early stages, and in what proportion of cases the perirectal glands are involved. Hausmann, of Vienna, has stated that out of 112 cases of carcinoma of the intestines examined post mortem, the disease was purely localized to the bowel wall in 55, or 50 per cent. A careful study on the same lines has been made by Dr. McVay¹ from the Mayo Clinic. He has very carefully investigated 100 specimens of carcinoma of the rectum removed at the Mayo Clinic. He found that 53 per cent showed no involvement of the glands, 30 per cent showed involvement of less than half of the regional lymph-nodes, and 17 per cent showed involvement of more than half of the glands. These figures, if true, should mean that complete *en bloc* removal of the affected portion of bowel, together with the regional glands, should result in 50 per cent of permanent cures. Up to the present, however, no such high rate of permanent cures has been recorded. There may, however, be several reasons which account for this. My own figures show that since complete removal of the rectum in all cases has been carried out together with the regional glands, there have been very few local recurrences, recurrence, when it has taken place, generally being in the liver or abdomen. It would seem that the growth in these cases had already spread by metastasis from distant parts before the operation was performed. A very interesting point is mentioned by McVay, namely, that the size of the growth has apparently no bearing upon the amount of glandular involvement. Thus, in some cases where the growth was very large there was no glandular involvement, while in others where there was only a small ulcerated growth, apparently quite early, extensive glandular involvement had evidently occurred.

The perineal resection of the rectum together with the fat and lymphatics in its immediate neighbourhood which is now extensively practised does remove all the primary glands, but admittedly cannot remove all the secondary glands. The more extensive operation of abdomino-perineal resection removes a greater number of secondary glands, but it is very doubtful whether any case where the secondary glands are already involved can be saved from recurrence by operation, however extensive, while the greater mortality from the abdomino-perineal operation renders it undesirable in many cases, and makes it doubtful whether the advantage gained by a slightly increased lymph area is sufficient compensation for the very greatly increased risk.

Mortality figures vary very greatly. The following may be given for what they are worth :—

ABDOMINO-PERINEAL RESECTION			PERINEAL RESECTION		
		Mortality per cent			Mortality per cent
Hochenegg	..	52.9	Hochenegg	..	10.6
Eichoff	..	75.0	Eichoff	..	24.5
Fisk-Jones and McKittrick	..	33.0	Fisk-Jones and McKittrick	..	8.0
			Lockhart-Mummery	..	5.0

This table shows sufficiently clearly the very much reduced mortality-risk of the posterior against the abdominal route for resection of the rectum.

The greatest handicap to surgeons in dealing with cases of cancer, whether of the bowel or elsewhere, is that the disease is not diagnosed early enough. Assuming that a proper operation is performed, the ultimate result is almost entirely dependent upon getting the case at an early stage. At present at least 50 per cent of the cases brought to the surgeon are already inoperable. Thus Hochenegg found that out of 779 cases, 310 were already inoperable. Eichhoff reports 1021 from the Breslau Clinic, out of which 505 were inoperable. Rigby reports 40 cases, with 23 inoperable. Fisk-Jones and McKittrick 50 cases, of which 20 were inoperable. The figures from St. Mark's Hospital give nearly 80 per cent inoperable. These figures alone show what a terrible handicap surgery has in dealing with these cases. Dr. Rawson Pennington very truly points out that if people who had reached the cancer age were regularly overhauled we should greatly improve the results of operations for cancer. Most people, he says, have their motor cars overhauled regularly, but neglect to take the same precautions with regard to their own bodies. Dr. Louis Hirschmann suggests that the insurance companies might help in this connection, and quite recently some of the companies have started a scheme for giving their policy-holders free medical examination yearly.

All surgeons who have recently written on the subject agree strongly in condemning the use of X rays or radium before operation, the effect of such treatment being to interfere very seriously with the healing of the wound. Most surgeons agree that radium is useless in dealing with cancer of the rectum, and that X rays are only of value in inoperable cases, or in dealing with metastases which cannot be reached by the surgeon.

The following is a description of my operation for excision of the rectum together with the surrounding tissues by the posterior route. This operation is just now the most popular one, and it has proved very successful both from the point of view of immediate mortality and subsequent freedom from recurrence. It is suitable in any case where the growth is in the anus or rectum proper, but it is not suitable for cases at the rectosigmoidal junction, or above this. The operation may be performed either in one or two stages. There are advantages in performing it in two stages, the colostomy being done a week or ten days before the resection. At the same time that the colostomy is done an opportunity is afforded of examining the liver, abdominal glands, and upper attachments of the growth. The operation is done under spinal anaesthesia alone, and regional anaesthesia, or under a combination of these and twilight sleep or gas and oxygen. Ether and chloroform are not used at all. In performing the operation upon a male, a gum-elastic catheter, No. 10, is tied into the bladder previous to operation. In women the vagina is asepticized and lightly packed. The first step in the operation is to pass a stout silk ligature subcutaneously round the anus with a curved needle. This is tied up so as completely to obliterate the anus. After this the parts are thoroughly aseptitized and the surgeon cleans up and puts on his gloves. The incision starts over the lower part of the sacrum, and sweeps round the anus so as to include a piece of skin about 2 in. wide. The incision is deepened and the parts are separated so as to expose the coccyx. The latter is then disarticulated through the sacrococcygeal joint with a scalpel, and the deep fascia divided opposite the joint. The first finger of the left hand is passed deep to the levator ani muscle on the lower side and between it and the rectum, as shown in *Plate XLII, A*. The levator ani is then divided with a pair of scissors on the outer side of the finger, as shown by the dotted line. This manoeuvre is repeated on the opposite side, and the rectum will then be

PLATE XLII.

EXCISION OF THE RECTUM

(LOCKHART-MUMMERY'S OPERATION.)

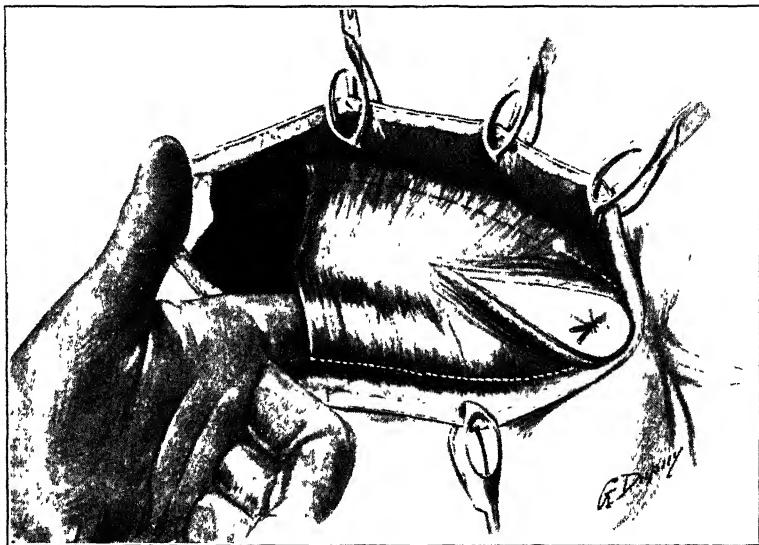


Fig. A.

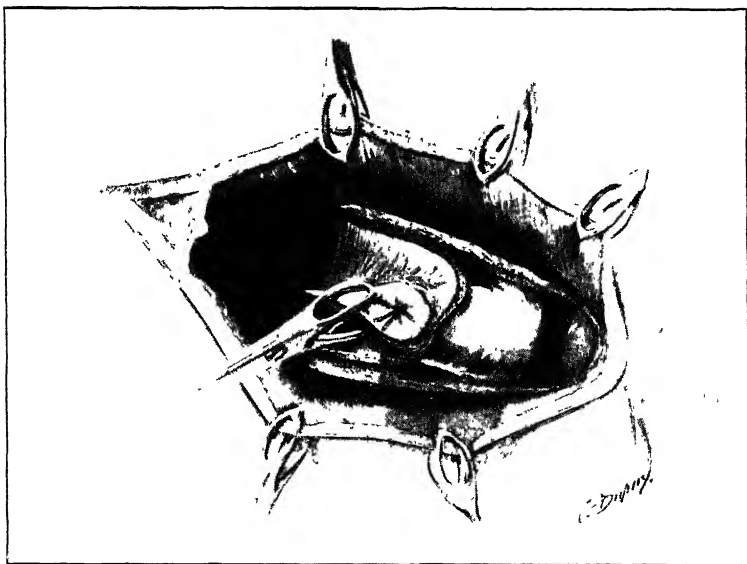


Fig. B.

PLATE XLIII.

EXCISION OF THE RECTUM—*continued*

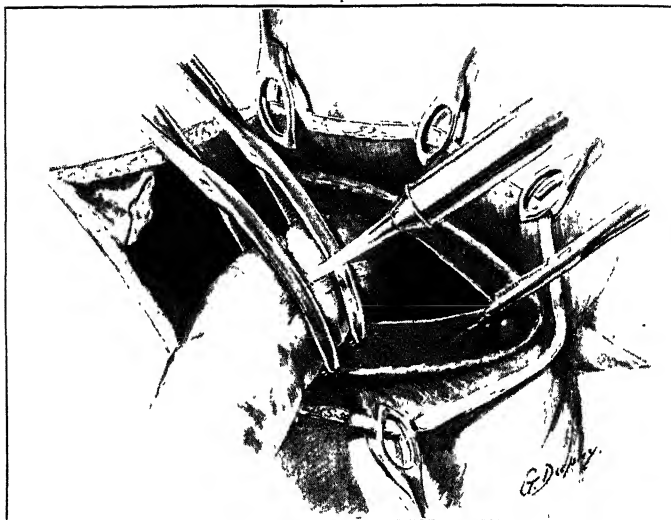


Fig. C.

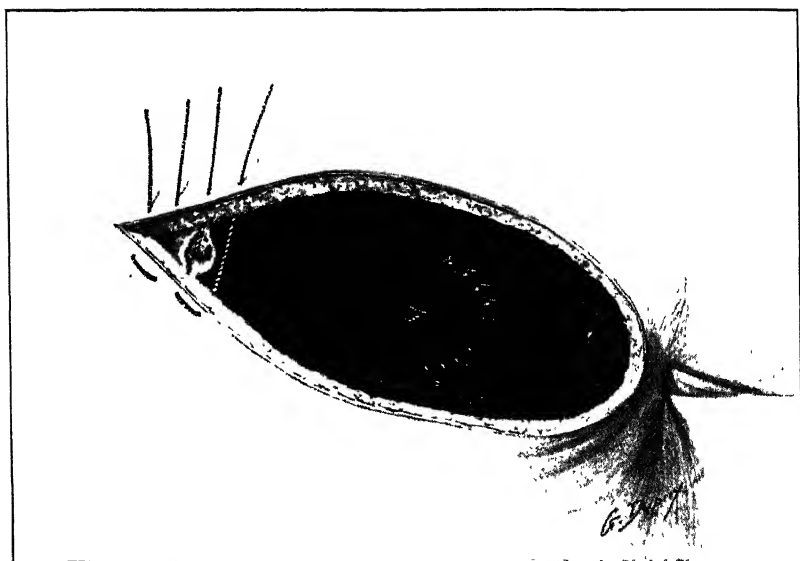


Fig. D.

free except in front. In a female this is dissected off the posterior vaginal wall until the peritoneum is reached. In the male this is a little more difficult, and the only guide is the catheter tied into the urethra, which must be felt for, the division being continued by dissection with scissors until the lower edge of the prostatic capsule is reached. After this it will be found that the rectum will easily strip off the prostate and vesiculæ seminales until the peritoneum is reached (*Plate XLII, B*). The peritoneum should then be opened on the anterior aspect of the rectum, and divided close to it on both sides. The rectum will now come down freely, and is only attached to the sigmoid above by the mesorectum. The latter is divided as high up as possible, the bleeding points being clamped off and all vessels carefully tied. There is nothing left now but the bowel itself. This is clamped with two clamps so as to leave about half an inch of bowel between the clamps, and the bowel is divided with a Paquelin cautery (*Plate XLIII, C*), the rest of the wound being packed off during this process. The stump of the sigmoid is then inverted by a Mickulicz stitch or a purse-string suture. The next step is to close the peritoneum. This is done with a catgut suture on a curved needle starting at the lower posterior part of the opening, a continuous stitch being carried on to the opposite side until the peritoneal cavity is completely shut off. Any bleeding points are then tied off, and the wound is closed with stitches without drainage (*Plate XLIII, D*).

This operation should take about thirty-five minutes. The parts removed consist of the rectum, the anus and surrounding skin, the glands in the hollow of the sacrum, most of the levatores ani muscle, and the rectum and the surrounding fat. The mortality from this operation in the author's hands is 5 per cent, and the patient is generally out of bed in about three weeks.

The special points in performing the operation are: (1) Good light, which can be directed into the wound; (2) Great care in the anterior dissection; (3) Division of the peritoneum close to the bowel, so as to avoid injury to the ureters; (4) Division of the mesorectum before dividing the bowel; (5) It is very important to make sure that the peritoneal floor is completely closed, or there is a risk of a hernia of small gut.

REFERENCE.—*Ann. of Surg.* 1922, Dec., 755.

RECTUM, CONGENITAL MALFORMATIONS OF.

J. P. Lockhart-Mummery, F.R.C.S.

William S. Quinland¹ classifies general malformations in three groups: (1) A septum of mucous membrane; (2) Blind ends connected to some other part; (3) Free blind ends. He bases his article on a study of 27 cases. Of these, 20 occurred in the rectum, the remainder being in the colon or ileum. He quotes the figures from the Boston Lying-in Hospital showing 1 case of imperforate anus out of 10,000 confinements. At the Chicago Lying-in Hospital there were 2 cases in 10,000, while in the New York Lying-in Hospital there were 28 cases out of 50,000. This would give a total of 31 out of 70,000 children, so that the condition is evidently quite uncommon. It was apparently much more common in males than females: out of 28 cases, 24 were males and 4 females. Of his own 27 cases, 13 were males, 6 were females, and in 8 the sex was not given. The prognosis on the whole is not very good except in those cases where there is only a diaphragm. Dr. Quinland is of opinion that permanent colostomy gives the patient the best chance when the case comes into either the second or third groups.

REFERENCE.—¹*Boston Med. and Surg. Jour.* 1922, Dec. 14, 870.

RECTUM, FOREIGN BODIES IN. *J. P. Lockhart-Mummery, F.R.C.S.*

A great variety of foreign bodies of one kind or another have had to be removed from the rectum. These fall into three classes: (1) Foreign bodies which have been swallowed with food, such as pieces of wood, pins, needles, chicken and fish bones, brooches, tooth-plates, etc.; (2) Articles which have got in as the result of accidents, such as clinical thermometers, enema nozzles, umbrella handles, pieces of wood, sticks, etc.; (3) Foreign bodies which have been introduced by the patients themselves for some unexplained reason. These latter may include almost any kind of article, such as inkpots, tumblers, glass bottles, wooden boxes, and in one case a box of tools was introduced by a convict in order to hide it.

The removal of some of these foreign bodies may be an exceedingly difficult matter. In a paper by Dr. Arthur Landsman,¹ he suggests a very ingenious method of removing some of these foreign bodies, namely, that under anaesthesia and with a speculum in position, strips of adhesive plaster should be introduced by alligator forceps and moulded over the sharp portions of the foreign body in order to prevent damage to the rectum during the process of removal. He points out the necessity, after the removal of any foreign body from the rectum, of making a careful examination with a speculum and artificial light to look for tears or injuries to the bowel wall, so that these may be dealt with at once and acute septic complications prevented. He recommends that full general anaesthesia be used, and the sphincter fully dilated, before attempting to remove any difficult foreign body.

At a discussion which occurred recently at the Proctological Subsection of the Royal Society of Medicine as to the best methods of removing foreign bodies from the rectum, it was generally agreed that by far the safest method, where a difficult and large foreign body had to be removed, was to open the abdomen, and with one hand in the abdomen to press it carefully down so as to manipulate it through the rectum without injury, the fingers of the other hand to be inserted into the rectum to guide it, and to guard the bowel against any jagged points. This is far better than doing a posterior proctotomy and lacerating the bowel with instruments.

REFERENCE.—¹*N. Y. Med. Jour.* 1922, Dec., 703.

REFRACTION. *A. Bernard Cridland, F.R.C.S.E.*

T. Harrison Butler,¹ in delivering the Middlemore Lecture for 1922, takes refraction as his subject, and puts forward some sound and practical common-sense views on this important branch of ophthalmology. Such a remark as "the object of refraction is to make the patient comfortable and not the solution of a problem in optics" is well worth the attention of any refractionist, no matter how experienced he may be.

For adults, a moderate visual result may be more compatible with comfort than a higher one, and the question as to whether patients should wear glasses constantly or not may often be left to their own common sense. It is otherwise with children, who must not be allowed latitude in this respect, for a poor visual acuity tends to make the child unsocial and to fail to develop the habit of observation; children must wear their spectacles constantly.

Of the symptoms caused by errors of refraction, faulty vision is naturally placed first; headache is the next, with pain in and about the eyes. Vertigo is rightly regarded by him as a rare symptom, and then probably due to a heterophoria; but most frequently it is caused in the young by aural trouble, and in the elderly by circulatory disturbances in the brain.

Butler lays great emphasis on the value of **Retinoscopy**, which he regards as the alpha and omega of refraction. The necessity for the use of a cycloplegic

in adults depends to a great extent on the experience of the surgeon. For children atropine is necessary, and must be used for at least twenty-four hours in order to obtain a certain result.

Speaking of myopia, Butler recognizes two types, namely: overgrowth myopia, which is a developmental anomaly; and progressive myopia, which is associated with pathological changes in the fundus. The former is harmless, and rarely exceeds 3D; the latter is serious, and may ultimately lead to blindness. Progressive myopia has recently been found to be more common in agricultural and mining districts where in-breeding exists, and heredity must be regarded as the chief factor in its production. The rate of progression in this form of myopia is a good deal dependent on the nutrition and general well-being of the child, and the importance of maintaining the general health at the highest standard possible cannot be too strongly emphasized.

With regard to astigmatism, the greatest care should be observed in order to obtain an accurate measure of both the angle and degree. As to the spectacles themselves, Butler seldom prescribes toric lenses or Crookes glass.

Bishop Harman,² investigating the disability due to defective vision in myopes, has found that those with 3D to 5D who were engaged in close continuous work showed failure in work to the extent of 33 per cent; those from 5D to 10D to the extent of 60 per cent; and those over 10D to 77 per cent. The whole showed a failure of 53 per cent, whereas myopes of the same order who did not engage in continuous close work failed only to the extent of 9.4 per cent. He suggests standards of vision for scholars and teachers, as follows:—

Candidates	Age	Sphere	Cylinder	Sphero-cylinder
a. HYPERMETROPIA.				
All	11-12	5D	4D	Average of four meridians = 5; As. not over 3D. E.g., + 3.5D sph. c., + 3D cyl.
b. MYOPIA, WITH MIXED ASTIGMATISM.				
Teacherships ..	21	5D	4D	As in hypermetropia.
Senior scholars ..	16	4D	3D	Average of four meridians = 4; As. not over 3D. E.g., - 3D sph. c., - 2D cyl.
Junior scholars ..	11	3D	3D	Average = 3D; As. 2D. E.g., - 2D sph. c., - 2D cyl.

REFERENCES.—¹*Brit. Med. Jour.* 1923, i, 843; ²*Ibid.* 58.

RELAPSING FEVER.

Sir Leonard Rogers, M.D., F.R.C.P., F.R.S.

S. T. Darling¹ points out the rôle played by the rat in the dissemination of relapsing fever in Panama, while the *Spirochaeta novyi* is conveyed to man by the tick *Ornithodoros tajale*, the nymphs of which may be found on *Mus rattus* and all its three stages on man. The rat is susceptible to the infection of relapsing fever, and the nymphs may convey the disease from one rat to another, while the dispersal of *Mus rattus* into suburban and rural areas, as the result of its struggle for existence with the stronger *Mus norvegicus*, may disseminate the transmitting tick of relapsing fever into new areas. L. H. Briggs² describes cases of relapsing fever in California, where the first-known endemic cases in the United States were found, although a number of imported cases had previously been recorded. In the recent cases the bed-bug was believed to be the carrier of the infection, but unfortunately animal infections were not obtained, so that the precise type of the disease could not be worked out.

S. P. Selkin³ records cases of extensive necrosis of the costal cartilages in relapsing fever in Russia in patients debilitated by underfeeding.

REFERENCES.—¹*Jour. Amer. Med. Assoc.* 1922, Sept. 2, 810; ²*Ibid.* Sept. 16, 941; ³*Surg. Gynecol. and Obst.* 1922, July, 27.

RESPIRATION, ARTIFICIAL.

Sir W. I. de C. Wheeler, F.R.C.S.I.

When required *on the operating table*, artificial respiration should not be by Sylvester's method or any of its modifications. In an emergency during operations, artificial respiration carried out by modern text-book methods is too slow, and with an open abdominal wound is both inconvenient and dangerous. Furthermore, if there is cardiac failure, massage of the heart cannot be carried on through the abdominal wound simultaneously with Sylvester's method. Artificial respiration by the old direct method employed exclusively in the early '70's is the best.

Woods¹ draws attention to this direct method. The procedure is simplicity itself. There is no need to intubate the larynx; the mouthpiece of an ether inhaler is generally at hand, and when placed in position on the patient's face makes an admirable funnel through which the surgeon can blow into and inflate the patient's lungs (*Fig. 79*). In absence of a face-piece, a funnel can be readily extemporized with the closed hand. There is no resistance to overcome; the air easily enters and inflates the lungs, and is expelled automatically, or rather gurgles out with the help of gentle pressure on chest or abdomen. The process is repeated every four or five seconds until normal rhythmical respirations are restored.

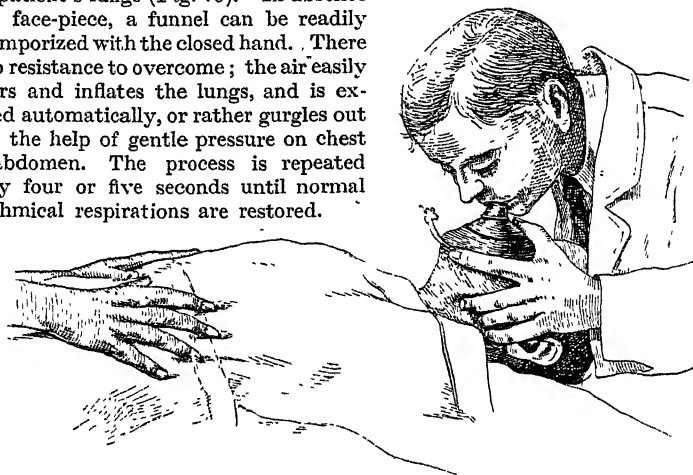


Fig. 79.—Method of inflation of lung by blowing through face-piece of ether inhaler.

The direct method of artificial respiration used exclusively in the early '70's was abandoned owing to faulty physiological reasoning. It was thought that, because expired air contained poisonous carbonic acid, it was wrong and dangerous to introduce it into the lungs. Such reasoning had many fallacies. First, as pointed out by Woods, the first rush of air supplied by the donor will be from the trachea and upper air-passages, and therefore pure; and, furthermore, the very small quantity of carbonic acid gas in question could not be poisonous, as is shown by the free use of the rubber bag by those who employ ether by the closed method. In fact, the inflation of the lungs with expired air not only stimulates the respiratory centre, but also increases the volume of the pulse. Recently it has been pointed out that an alkali deficiency of the blood during anaesthesia can be corrected by the inhalation of carbon dioxide gas mixed with the inspired air (*see MEDICAL ANNUAL*, 1923, p. 34).

REFERENCE.—¹*Trans. Roy. Acad. Med. Ireland*, 1906.

RETINA, DISEASES OF.*1. Bernard Cridland, F.R.C.S.E.*

Eales' Disease.—William C. Finnoff,¹ in a paper delivered before the Section of Ophthalmology of the American Medical Association on the interesting condition known in this country in honour of its discoverer as Eales' disease, considers that insufficient attention has been paid to it in view of the serious disturbance of vision which may arise. He thinks that it is probably more common than the number of cases, 110 only, which have been so far recorded, would indicate. His own experience is based on the observation of some 17 cases, and he urges the most complete investigation in every case. In the absence of any etiological factor which might be revealed by an examination of the blood and urine or by a general physical examination, he directs special attention to a tuberculin test, relying only upon a focal reaction in the eyes themselves as being a proof that the condition is of tuberculous origin. He holds that Eales' disease is not truly a disease, but a symptom due possibly to a number of conditions, and suggests that it is adequate to refer to it as "recurrent hæmorrhages into the retina and vitreous of young persons". In the discussion which followed, Zentmayer suggested the advisability of obtaining a skiagram of the sella turcica, as he had reason to believe that a disturbed action of the pituitary, the suprarenal, or both, might play a rôle in causation. George S. Derby stated that he had met with several cases in persons over the age of 40.

Albuminuric Retinitis.—William L. Benedict,² writing on the etiology of the retinitis of nephritis, considers that the ophthalmoscopic picture known as 'albuminuric retinitis' is really a composite one in which three possible etiological factors are at work at once, each modified to some extent by the other. The three factors are an azotæmia, where the urea content of the blood is increased, hypertension, and sclerosis of vessels. Retinitis may be found with only one, any two, or all three of these factors. He suggests that the term 'fundus changes or retinitis in nephritis' would be more acceptable than 'albuminuric retinitis'.

A case of acute nephritis which presented the characteristic ophthalmoscopic picture of albuminuric retinitis is recorded by F. Tresilian,³ the interest in which lies in the fact that the patient lived for six years after the attack, working hard meanwhile. A second attack was fatal, but no ophthalmoscopic signs were found.

The Significance of Retinal Hæmorrhages.—C. O. Hawthorne,⁴ in opening a discussion on this subject at the Oxford Ophthalmological Congress, July, 1922, expressed as a physician the following views: (1) That retinal hæmorrhages may exist without recognized prejudice to vision, and ophthalmoscopic examination is therefore a necessary part of every clinical examination; (2) That such hæmorrhages may be the first objective signs of serious disease, and a discovery of them, therefore, demands a complete examination of the patient; (3) That the recognition of retinal hæmorrhages is often of high value in directing the observer to a correct interpretation of the clinical facts, while the prognostic significance of the observation *per se* is indeterminate; (4) That retinal hæmorrhages do occasionally exist as isolated clinical facts, and when so existing are comparable to hæmorrhages in other parts of the body (hæmatemesis, hæmaturia, hæmoptysis, etc.), for which no ready explanation is at hand.

P. H. Adams,⁵ opening the discussion from the ophthalmic point of view, stated that the finding of a retinal hæmorrhage in a case at once gave it a medical aspect in which the two problems of diagnosis and prognosis became of chief importance. In his experience the occurrence of a retinal hæmorrhage definitely shows that the case has passed from the more or less controllable

condition of hyperpiesia to one of true arteriosclerosis. At the same time, however, he points out that patients with arteriosclerotic retinitis and retinal hæmorrhages are known to live for many years, well on into the seventies and eighties, unless the kidneys become involved, in which case the prognosis as to life is bad. An interesting point is that in the majority of these cases a vascular lesion is usually the cause of death. Ophthalmoscopically, it is possible from the situation and character of retinal hæmorrhages to have a very good idea as to their causation—i.e., whether diabetic, albuminuric, or arteriosclerotic—although of course no assured diagnosis could be so given.

Ernest Clarke⁶ considered that one of the surest signs of the presence of toxæmia is a marked lowering of the accommodating power, and when this is accompanied by hypertension it is a fairly certain warning that arteriosclerosis may be expected. He emphasizes the importance of removing eye-strain by accurate correction with glasses in all those who are the subjects of arteriosclerosis.

The Differentiation and Prognosis of Arteriosclerosis and Renal Retinitis.—H. Batty Shaw,⁷ opening a discussion on this subject, expressed the view that both conditions must be regarded as toxic in origin, and suggested that for the terms 'arteriosclerotic' retinitis and 'renal' or 'albuminuric' retinitis, the terms 'chronic' and 'acute', 'late' and 'early', or 'minimal' and 'maximal' toxic retinitis should be substituted, leaving for the future the investigation of the nature of the toxin concerned.

R. Foster Moore,⁸ continuing the discussion, came to the following conclusions: (1) That in a proportion of cases of general arteriosclerosis, as the disease of the retinal vessels increased, exudates formed in the retinal tissues which were probably dependent upon the local vascular disease; (2) That the ophthalmoscopic appearances resulting were in considerable measure distinctive; (3) That the prognosis implied by this form of retinitis as to length of life was quite uncertain, but might extend to several or even many years, and that it differed greatly from renal retinitis in this respect; (4) That a large number of these patients died of a gross vascular cerebral lesion—according to the present investigation, 50 per cent; and (5) That the condition called for a separate recognition, and that the term 'arteriosclerotic retinitis' seemed appropriate. P. Bardsley,⁹ agreeing that a toxic cause is common to both forms, regards sclerosis as the index of the chronicity of the toxæmia rather than of its acuteness.

P. H. Adams¹⁰ notes that in his experience 'renal' retinitis appears to be much less common than formerly, and agrees that toxæmia is probably the cause of both 'renal' and 'arteriosclerotic' retinitis. At the same time there was a distinct difference in the prognosis as to life in the two types, the renal being the much more grave. He mentions the case of a man with a septic wound of the hip-joint in whom a typical 'renal' retinitis was observed, but after amputation and free drainage the man recovered both health and sight, the ocular condition presumably clearing up.

Arthur Ellis,¹¹ as the result of the investigation of 19 cases as regards renal function, evidence of vascular disease, and retinitis, both clinically during life and in the post-mortem room, found that the cases fell into two groups: (a) those with evidence of gross renal disease, (b) those where vascular changes were most marked, while the renal function was fair. Both groups showed high blood-pressure. The average age of the vascular group was 10 years higher than that of the renal, and the post-mortem findings confirmed the opinion that the two groups were distinct.

J. H. Fisher¹² considers that if the toxæmic origin of retinitis be true, proof by clinical pathologists should be possible by investigation of the blood and

urine; for, if the kidney is healthy, the toxins should be eliminated, and so found in high concentration in the urine and in low concentration in the blood; but if the kidney is diseased, the toxin should then be found in high concentration in the blood.

REFERENCES.—¹*Jour. Amer. Med. Assoc.* 1922, Sept. 16, 939; ²*Surg. Gynecol. and Obst.* 1922, Sept., 362; ³*Brit. Med. Jour.* 1923, i, 148; ⁴*Ibid.* 1922, ii, 1153; ⁵*Trans. Ophthalmol. Soc. U.K.* 1922, 211; ⁶*Ibid.*; ⁷*Lancet*, 1922, ii, 1222; ⁸*Ibid.*; ⁹*Ibid.*; ¹⁰*Ibid.*; ¹¹*Ibid.*; ¹²*Ibid.*

RICKETS.

Frederick Langmead, M.D., F.R.C.P.

A brief summary of the recent experimental work in connection with the etiology of this disease was given in the MEDICAL ANNUAL for 1923. Both it and clinical observations indicate that many factors are concerned in the etiology, but their relative importance is unsettled, and the actual determining cause, if such exists, has still to be found.

H. Corry Mann¹ has observed 553 cases of rickets, of which 449 showed slight or severe deformity. As controls, 428 normal children were examined; of these, 242 were of families free from rickets, and 186 were members of families in which it had occurred. The cases were observed over a period of from twelve to eighteen months. They were clinically examined and the home conditions were carefully investigated, with regard especially to the income of the parents, the housing, and the diet. He considers that there was no evidence that bad housing, overcrowding, or deficient air space was responsible, a result directly opposite to that arrived at by the Glasgow workers. Ricketty children and controls appeared to be living under exactly similar conditions. There was, on the other hand, clear evidence that faulty diet was conducive to rickets. Of the 242 non-rachitic children in families free from rickets, 77 per cent were either breast-fed or fed on fresh or dried milk, or on some combination of these, while only 11·4 per cent were fed partly or entirely on condensed milks. Of the 533 cases of rickets, only 28 per cent were fed by breast or on fresh or dried milk, or on a combination of breast and fresh or dried milk, while 30·3 per cent were fed partly or entirely on condensed milk. He concludes that if a wide survey be taken of the conditions which predispose to the occurrence of rachitic deformities in children under the age of two years, the continual use of an unbalanced diet, characterized by deficiency of fat and excess of carbohydrate, will be found to have antedated the appearance of symptoms in about 45 per cent of the cases. Thus the view held by most clinicians of experience, and emphasized many years ago by Cheadle, is supported by a careful investigation.

A truth often overlooked is the occurrence of severe rickets in several members of a family living under conditions of housing, hygiene, and diet no worse than those of their non-ricketty neighbours. Perhaps this may find an explanation in the experiments of Korenchevsky,² who attaches considerable importance to heredity. There is, he believes, a congenital disease of the skeleton which, if not rachitic, at least predisposes to it. To prevent this he advocates in the mother's diet, during pregnancy and especially during lactation, an adequate amount of all the elements so much discussed—the anti-rachitic vitamin, Calcium and Phosphates, and also the same substances in the infant's diet, combined with abundant light, fresh air, and muscular exercise. Thus clearly he is prepared to acknowledge that the apparently contending views of various investigators have all an element of truth in them.

A well-organized and systematic study of the disease has been made in Vienna by Harriette Chick³ and her co-workers, who observed about 70 infants over a period of from six months to a year. They were fed on one of two Diets. Diet I consisted of the fresh undiluted milk of stall-fed cows, sterilized, and supplemented by large amounts of cane sugar; after 5 months of age,

cooked starch was added as semolina and potato. Diet II was a full-cream dried milk, reconstituted by the addition of water, sometimes supplemented by the addition of sugar, at 6 months by semolina, and at 9 months by potato. The dried milk had a low value in fat-soluble A, and was no better than the fresh winter milk, though the former was obtained from grass-fed cows. Every infant on Diet II received also a daily ration of cod-liver oil up to $1\frac{1}{2}$ drachms daily of the pure oil, which brought its diet up to one notably richer in fat-soluble A than Diet I. In caloric percentages Diet I contained protein 13, fat 28, carbohydrate 59, while Diet II contained protein 20, fat 45, carbohydrate 35. The total caloric value of both was high, while Diet I had a relatively high carbohydrate content. Indeed, most clinicians would hold that all the infants were fed upon an ill-balanced diet with too high a caloric value, since not only were they given whole milk, with its usual excess of protein, but this was supplemented by cane sugar, and in those on Diet II by fat and sometimes also by carbohydrate. Thirty-four infants were fed on Diet I, and the same number on Diet II; otherwise they were subjected to the same conditions of life. The general health in the two groups was not very different, that of those on Diet II being perhaps somewhat better, since they suffered less from respiratory troubles in winter. On admission all were free from rickets. Seventeen infants in Group I developed rickets as judged by radiograms, no infant in Group II. All the cases of rickets occurred in the winter, so that open air and sun in the summer neutralized the rickets-producing influence of the diet.

When clinical standards—cranio-tabes, rib-beading, cranial bossing—were accepted, there were additional cases. In summer 10 occurred, 5 on Diet I and 5 on Diet II; and 2 in winter on Diet I. On Diet I, out of 34 children, there were thus apparently 24 cases of rickets; and on Diet II, 5 cases. The figures may be taken as showing the readiness with which rickets develops as the result of excessive carbohydrate feeding, and those who have seen the effect of sweetened condensed milks where the same excess obtains, will not be surprised by them. Emphasis is laid on cranio-tabes as the earliest clinical sign of developing rickets; but surely head-sweating, fretfulness, pallor, flabbiness precede any bony change. In connection both with cranio-tabes and with the radiographic changes portrayed in the bones, the high incidence of congenital syphilis in Vienna has hardly been sufficiently taken into consideration, particularly since many of the infants were illegitimate.

With regard to treatment, the rickets-producing Diet I failed to cure, as might be expected, while Diet II (containing cod-liver oil) cured in winter. Spontaneous cure occurred in spring and summer, when the babies were much out of doors, independently of the diet. In winter and spring, infants on Diet I were also cured by cod-liver oil, by exposure to sunlight, or by the mercury vapour quartz lamp, sunlight being most efficacious. The addition of cod-liver oil to the open-air treatment was thought to accelerate improvement.

Hugh P. Ashby¹ has taken measurements of the pelves of 150 normal and 150 rickety girls of all ages from 1 to 14 years of age. At the age of 5 years the external conjugate in normal children averaged 4·8 in., and in rickety children of the same age only 4·1 in. At 13, the average measurements were 6 in. and 4·9 in. respectively. The conclusion drawn is that rickets in early childhood and continuing during childhood is the cause of the rickety flat pelves of adult women.

REFERENCES.—¹*Med. Research Council Special Rep.* 1922, No. 68; ²Quoted in *Brit. Med. Jour.* 1922, ii, 1232; ³*Med. Research Council Special Rep.* No. 77; ⁴*Brit. Med. Jour.* 1922, ii, 906.

RINGWORM. (*See also SKIN DISEASE IN CHILDREN.*)*E. Graham Little, M.D., F.R.C.P.*

Whitfield¹ contributes a very useful paper on this subject, which he divides into four headings: (1) Ringworm of the hairy skin; (2) Of the nails; (3) Of the smooth skin; (4) The so-called 'dhubi itch'.

1. *Ringworm of the Hairy Skin*.—X Rays, given by an expert, form the most satisfactory method of treatment. It is advised that once ringworm has invaded the scalp, the whole head should be treated and not individual patches. After the treatment, the application of the following Ointment is advised:—

R	Acidi Salicylici	gr. xv	Adipis Lanæ	℥ss
	Acidi Benzoici	gr. xxv	Paraffinum Molle	ad 3j

If X rays are unobtainable or refused, treatment by Croton Oil is recommended. This is described as follows by the author. The oil itself may be painted over the patch in very small quantities, or one may use more freely an ointment consisting of one drachm of croton oil to an ounce of lard, rubbing this in gently with the finger, which should be covered with a rubber stall. This treatment should be carried out once a day, and before rubbing in any fresh oil the parts should be thoroughly bathed with very hot water, any pustules present being opened with a sterile needle and the contents bathed out. After a variable number of days either a severe pustular folliculitis will be produced, or the whole area will swell up into a sort of œdematous cushion. In either case the hair will be so far loosened that it may be drawn entire with its swollen root-sheath. The case must be carefully watched, since, if the process is carried too far, the formation of an abscess or sloughing of the skin results. Any appearance of whiteness of the treated skin is the earliest indication of a tendency to slough. In fortunate cases the whole of the affected hair will be shed together, but more frequently a few diseased hairs remain tightly set in the follicle, when each individual hair must be treated separately. A number 16 sewing needle is bent in a spirit flame to an angle of 45°, the angle being placed at a full quarter of an inch from the eye end. The pointed end is set in a needle holder or driven into a stick of soft wood. The eye end is dipped into neat croton oil, and the affected follicle is gently catheterized therewith. The oval end of the needle is fine enough to find its way into the follicle, but not sharp enough to pierce the side unless undue pressure is used. The eye performs a useful function in carrying a charge of croton oil which becomes rubbed off as the needle descends into the follicle. The operation demands a considerable degree of skill. During the whole of the croton-oil treatment the rest of the head should be kept thoroughly dressed with a 'guard' ointment. The treatment is not entirely free from risk of permanent loss of hair, but this never occurs over large areas unless the oil is grossly over-used; on the other hand, it has the disadvantage that needling is almost always necessary to finish the case, and this demands expert skill.

Next to croton oil, an ointment consisting of equal parts of Sodium Chloride and Vaseline is recommended. This should be rubbed in thoroughly once a day after bathing the head with very hot water. Another alternative is an ointment consisting of 40 gr. of Salicylic Acid to the ounce of Nitrate of Mercury ointment. This is rubbed in twice a day and washed out once a week. Or a stronger Benzoic and Salicylic Acid ointment—a drachm of the first, half a drachm of the second, to the ounce—rubbed in twice a day. For ringworm of the beard region, the same methods (with the exception of the croton oil and sodium chloride treatments) should be used.

2. *Ringworm of the Nails*.—The author recommends removal of the nails under an anæsthetic. The nail bed, when showing hyperkeratosis, should be

scraped down with the blade of a pair of scissors, and when bleeding has stopped the whole nail should be dressed with 20 gr. Salicylic Acid to the ounce of Chrysarobin ointment. The nail bed should be dressed with this ointment daily for at least four weeks. Relapses, it is said, are not common.

3. *Ringworm of the Smooth Skin*.—This offers little difficulty. Early cases may be painted with equal parts of Tinctura Iodi and Liqueur Iodi Fortis, or have the application of the mild benzoic and salicylic ointment described above, or of chrysarobin ointment; suppurating types are best treated with the latter.

4. *Dhobi Itch*.—The following method is favoured by the author: In the morning, after a bath, all flaps of frayed horny layer are trimmed away and the roofs of any vesicles removed. The areas of infection are then well rubbed with a cotton-wool swab saturated with 10 per cent solution of Chrysarobin in equal parts of acetone and methylated spirit. This solution dries in a few moments; a pair of cheap cotton socks under the regular socks protects these from the chrysarobin. In the evening as much as possible of the chrysarobin is washed off with soap and water in order to avoid staining the bedclothes, and the 5 per cent Benzoic Acid and 3 per cent Salicylic Acid ointment is rubbed well in. Next morning this is washed off and the chrysarobin reapplied. This should be continued for four weeks unless chrysarobin erythema supervenes, when the solution must be stopped for a time and the ointment used day and night. After apparent cure, a local application of one or other of the following formulæ is advised for a considerable period: (1) Hydrargyri perchloridi, 2 gr.; acidi salicylici, 40 gr.; sp. vini methylati (60 per cent) ad 1 oz. (2) Cupri nitratis, 40 gr.; acetone and sp. vini methylati, each 2 oz.

Robertson² claims to have had uniformly favourable results in 61 cases of *ringworm of the hairy scalp in children* treated by the following method: The hair is cut short, permitting a good examination of the whole surface, the affected parts are shaved and then washed with ether soap, dried, and the following lotion applied: Calomel 5 gr., Tinet. Iodi (B.P.) 1 drachm; stir with glass rod—a reddish precipitate is formed. This lotion is poured upon small pieces of cotton-wool and applied to the ringworm area by gentle rubbing. The piece of wool is then discarded, clean white lint applied, and bandaged. The child returns to the clinic the next day, the dressings are removed, the areas are washed well with ether soap, Ammoniated Mercury Ointment (B.P.) applied, and a bandage again used. This process is continued until cure results, generally within fourteen days; the child is ready to return to school during the third week. The lotion must be daubed on, not rubbed in, and freshly prepared for each case. Only one application is said to be necessary. The author further specifies the technique he has found most advantageous. He divides the scalp into six equal areas. On the first day the whole scalp is washed with ether soap, and dried. To area 1 freshly prepared calomel-iodine lotion is applied gently, and ammoniated mercury ointment rubbed into the remaining five-sixths; the head is then bandaged. On the second day the five-sixths part is washed with ether soap, and the lotion applied to another sixth part. The part to which the lotion was applied is then washed as a separate area, and the ammoniated mercury ointment applied, and so on. On the seventh day the whole head is again treated as one area with ether soap wash, and ammoniated mercury ointment applied.

Exanthems due to Ringworm.—Generalized eruptions have been rarely reported in ringworm, notably by Scandinavian writers, usually in association with *Trichophyton*. Arzt³ contributes a series of twelve cases observed with a *Microsporon*. There was no pruritus, and in most cases the eruption was

limited to the trunk or trunk and limbs. It occurred chiefly as a follicular lichenoid rash, but there were sometimes vesicles and pustules, and in one case eczematization.

REFERENCES.—¹*Lancet*, 1923, i, 1124; ²*Brit. Med. Jour.* 1923, i, 1017; ³*Dermatol. Woch.* 1922, Dec. 9, No. 49 (abstr. in *Brit. Jour. Dermatol.* 1923, March, 113).

RODENT ULCER.

E. Graham Little, M.D., F.R.C.P.

Kennedy¹ gives the result of his experience in the treatment of this condition by the application of Chromic Acid solution, 10 per cent, in distilled water. He claims that this strength, while destroying rodent cells, does not affect those of healthy tissue. The duration of the treatment where the soft tissues only are affected averages three and a half months; where deeper tissues are involved, other means must be used. The author says, however, that rodent ulcer should never be allowed to reach that stage in the present day. The patient can usually follow his occupation throughout the treatment, and the scar is excellent. Recurrences can be dealt with in the same way.

Treatment is carried out as follows: When the crust, if any, has been removed and the floor of the ulcer cleansed with plain sterile water, chromic acid solution is applied to it and to the surrounding skin by means of a fine camel-hair brush. This is repeated daily until the patient complains of pain coming on about an hour after treatment and usually lasting an hour. Each succeeding day the pain is of longer duration and signs of irritation appear. The surrounding skin becomes red and oedematous, and at this stage, varying from the fifth to the tenth day, the treatment should be discontinued and a bland ointment substituted till the pain and inflammation subside. Plain vaseline or equal parts of boric and zinc ointments may be used. It is not material what emollient is chosen so long as the active treatment is interrupted at intervals regulated by the degree of pain and irritation present. During the first few weeks the ulcer may actually increase in size and depth, and it is well to warn the patient of this before beginning treatment; otherwise he is apt to conclude that he is getting worse instead of better. When the extreme limit of malignant invasion of the surrounding skin has been reached, further changes in the appearance of the ulcer take place. Its raised border becomes flattened and covered with healthy-looking epithelium which gradually advances along the floor of the ulcer towards the centre. The chromic acid applications are now attended by less pain, and eventually the ulcer appears to be completely healed. Should this occur during the use of the ointment, chromic acid should again be applied for a few days, and, if the disease has been eradicated, no effect whatever will be produced. Should, however, the apparently healthy epithelium thinly cover tissue in which malignant elements are still present, it will break down, and a continuation of the treatment will be necessary.

REFERENCE.—¹*Brit. Med. Jour.* 1922, ii, 844.

RUBELLA.

J. D. Rolleston, M.D.

SYMPTOMS.—G. Floystrup¹ records a case of rubella *sine exanthemate*, or German measles without a rash, which occurred in his own son, age 9 years, who had been exposed to rubella at school. He presented acute swelling of the cervical, occipital, axillary, and inguinal glands, together with other symptoms of rubella, such as coryza, conjunctivitis, and a slight rise of temperature, but no rash apart from a very few pale macules on the cheeks which lasted for a few hours only. The diagnosis was confirmed by the patient's brother developing a typical rubella rash, together with the other symptoms of the infection, a fortnight later.

DIAGNOSIS.—P. Brusa² describes some peculiar leucocyte findings during an

epidemic of ten cases of rubella. In all the cases examined the blood showed leucocytes with an excentric nucleus having the chromatin arranged like the spokes of a wheel. There might be one or two nucleoli, and the protoplasm was intensely basophil and vacuolated. These elements were probably of the nature of plasma-cells. They were present in the incubation stage, and were most numerous between the third and sixth day after the appearance of the eruption. Brusa regards the presence of these plasma-cells in suspected cases as of diagnostic value, as they are never found in scarlet fever, measles, or erythema infectiosum, and attributes it to some special irritation of the lymphatic system in rubella which is most pronounced in cases with a lymphatic constitution, and in debility from various toxic and infectious influences.

REFERENCES.—¹*Brit. Jour. Child. Dis.* 1923, 20; ²*Riv. di Clin. Ped.* 1922, 513.

SCARLET FEVER. (*See also* EAR; PUERPERAL PELVIC INFECTION; TONSILS, DISEASES OF.) J. D. Rolleston, M.D.

SYMPTOMS AND COMPLICATIONS.—F. Port¹ records 14 cases of scarlet fever with recent wounds, which formed 6 per cent of his 225 cases of scarlet fever. A large proportion of these occurred in adults. He quotes Hamilton, who collected 174 cases of *surgical scarlet fever* from literature and regarded the following points as characteristic: (1) Most cases occur in adults; (2) The incubation period is shorter than in ordinary scarlet fever; (3) The sore throat is less marked than usual, or even entirely absent; (4) The rash appears first in the neighbourhood of the wound, or in some unusual position; (5) Desquamation sets in earlier than usual. Otto² also reports two cases of surgical scarlet fever: one in a girl, age 11, following a lacerated wound of the foot, and the other after tonsillectomy in a woman, age 22, on whom the operation had been performed without the instrument having been sterilized directly after tonsillectomy on a scarlet fever convalescent (*see also* MEDICAL ANNUAL, 1923, p. 407).

J. von Petheo³ records six cases of scarlet fever in children, age from 2 to 5 years, in whom the symptoms developed four days after poisoning by lye. The clinical picture in each case corresponded to that of genuine scarlet fever, and desquamation always took place. In two fatal cases the autopsy findings were identical with those of septic scarlet fever. Five patients showed typical complications, such as nephritis, otitis, or adenitis.

W. T. Gardiner⁴ reports on two years' work on scarlatinal *otitis* at the Edinburgh City Hospital for Infectious Diseases to which he had been appointed otologist. His duties were: (1) To visit the hospital three times a week; (2) To see all cases in which ear symptoms were reported; (3) To instigate the necessary treatment for cutting short the otorrhœa. In the year 1920-21 158 otitis cases, or 10 per cent, occurred out of a total number of 1524 scarlet fever patients admitted, and in 1921-2 there were 142 otitis cases, or 6 per cent, out of 2204 admissions. The otorrhœa commenced most frequently during the first three weeks of the illness, the largest proportion being in the first week. Of the 300 otitis cases, 21, or 7 per cent, developed mastoid complications. Of these, 10 had an extension of the disease involving exposure of the lateral sinus to a greater or less extent. Only one case of meningitis was observed. In practically every case the pus from the mastoid abscess showed pure cultures of streptococci. In one case the pneumococcus was isolated, and one was sterile. Adenoids, when present, were always removed at the end of the mastoid operation. In otorrhœa cases adenoids, and as a rule the tonsils, were removed as soon as the child was fit for operation. The average duration of the discharge after removal of tonsils and adenoids was fourteen days. Gardiner is so strongly convinced that the nasopharynx is the

primary seat of otorrhœa in scarlet fever that he would lay it down as an axiom that every case of scarlet fever in which adenoids were present should have them removed before discharge from hospital, as otorrhœa is liable to develop with the first rhinitis the child contracts after leaving hospital.

J. A. Toomey, L. H. Dembo, and G. McConnell⁵ report a case of *acute hæmorrhagic encephalitis* in a boy, age 6 years, which occurred three weeks after the onset of scarlet fever. The autopsy showed thrombosis of the cerebral vessels accompanied by œdema and hæmorrhagic infiltration. The ventricles were full of clot, and the basal nuclei were hæmorrhagic, soft, and friable.

T. F. Krauss⁶ describes two cases of *sudden death* which occurred during the period 1913-22 at the Durand Hospital, Chicago, among 2322 scarlet fever patients, the total deaths being 83, or a mortality of 3.7 per cent. The first case was a woman, age 23, who died on the sixth day of disease five minutes after the first symptom. No autopsy was obtained. The second case was a woman, age 34, who died on the seventh day without the slightest warning. Post mortem the heart was dilated and flabby, the myocardium was red-yellow, and the cut surfaces showed many petechiæ throughout. Histological sections from the wall of the right ventricle, the interventricular septum, through the bundle region, and near the apex, showed fragmentation of the muscle fibres, loss of striation with faintly staining nuclei, and congestion of the small blood-vessels with hæmorrhage. There was no round-cell infiltration. Commenting on the case, Kraus remarks that a grave myocardial lesion in scarlet fever, as in the present case, may not be apparent clinically, and since in many of these cases death has followed some slight physical exercise, absolute rest in bed is indicated in all cases of scarlet fever, especially during the acute stage, and more particularly in those in which myocardial lesions may be suspected.

Scarlet Fever and Tuberculosis.—M. Kourtovitch⁷ remarks that there is no antagonism between scarlet fever and tuberculosis, and that the two diseases run their course independently without having any influence upon each other. There may, however, be a recrudescence of tuberculous lesions as the effect of a severe attack of scarlet fever, and when tuberculosis has reached an advanced stage, even a mild attack of scarlet fever may cause a generalization of tuberculous lesions elsewhere than in the respiratory tract, and cold abscesses with a fistula may present an inflammatory reaction after the onset of scarlet fever; and in some cases fresh fistulæ may form.

DIAGNOSIS.—G. Christensen⁸ reviews the literature on the *Wassermann reaction* in scarlet fever, including the recent paper by Laederich and Bory (see MEDICAL ANNUAL, 1921, p. 403), and records the results of his examination of the test in 110 cases of scarlet fever: 10 gave a positive reaction, but only with cholesterinized antigen, and the positiveness was only transitory. In the vast majority of cases of hereditary syphilis, whether latent or acute, the Wassermann reaction is positive with the least delicate of antigens. A strongly positive Wassermann reaction, therefore, in scarlet fever is as good evidence of syphilis as at any other time.

E. M. Dunlop⁹ tested the Wassermann reaction in 77 cases of scarlet fever, nearly all of which were in children: 72 were of the simple type, 4 were moderately severe, and 1 was severe. He found that there was no evidence that scarlet fever at any stage of the disease was the cause of a positive Wassermann reaction.

U. Friedemann and Nubian¹⁰ have found that Widal's test of liver function, or 'hæmoclastic crisis', though usually negative in infectious diseases, is positive in 95 per cent of the cases of scarlet fever. In complications such as tonsillitis, adenitis, and nephritis, a reaction which has become negative may become positive again. Owing to its constancy and long persistence, the writers regard

the test as superior to all others in the diagnosis of scarlet fever. In a certain number of their cases the diagnosis was made exclusively by this test, and was subsequently confirmed by typical desquamation. The test is carried out as follows: The patient takes his last meal at 9 p.m., and at 8 next morning drinks 200 c.c. of milk. The leucocytes are counted before and after the milk has been taken, at intervals of twenty minutes. A fall of 2000 is generally regarded as a positive reaction, but it is usually much more pronounced in scarlet fever.

PROPHYLAXIS.—M. de Biehler¹¹ has employed an antiscarlatinal Vaccine in every epidemic or family outbreak since 1913, and up to now has vaccinated 1298 persons, of whom 1265 were children, age from 4 months upwards, and 33 adults. Only 18, or 0.71 per cent, contracted scarlet fever, and the others remained healthy. No complications occurred.

TREATMENT.—R. Debré and J. Paraf,¹² who record an illustrative case in a girl, age 5 years, successfully treated by this method, state that injection of Convalescent Serum is indicated in malignant scarlet fever at the onset of the disease, as it does not appear to have any effect in the late complications. The serum should be injected intramuscularly and subcutaneously as well, in doses of 40 to 50 c.c., and the injections should be repeated the following days in the same or slightly smaller doses (30 to 40 c.c.). Intravenous injections, which may give rise to shock, should not be employed, unless great precautions are taken, and in cases where the prognosis appears hopeless otherwise. Three facts appear to indicate that the treatment is not specific, viz.: (1) Injections of the citrated blood of normal individuals was successfully employed in malignant scarlet fever by Zingher, although it is true that the beneficial effect of normal serum appeared to be less marked than that of convalescent serum; (2) Convalescent serum does not produce the Schultz-Charlton extinction sign (see MEDICAL ANNUAL, 1921, p. 403; 1922, p. 377) more readily than the serum of normal individuals; (3) The injection of convalescent serum does not have any definite action on the eruption of patients treated by this method.

A. Daniel¹³ has treated 33 cases of severe scarlet fever with intravenous or intramuscular injections of the whole blood of convalescents, which is easier to obtain than the serum. The doses varied with the age of the patient and the severity of the attack: 10 c.c. were given to infants between one and two years of age, and from 20 to 40 c.c. to older children and adults. The injections were given daily in the severest forms, intramuscularly except in urgent cases, where the intravenous route was employed. The first effects were fall of temperature and diminution of frequency of the pulse, followed by general improvement due to disappearance of the toxic symptoms.

REFERENCES.—¹*Munch. med. Woch.* 1922, 1691; ²*Ibid.* 1923, 301; ³*Jahrb. f. Kinderheilk.* 1923, i, 197; ⁴*Jour. of Laryngol. and Otol.* 1922, 497; ⁵*Amer. Jour. Dis. Child.* 1923, i, 98; ⁶*Jour. Amer. Med. Assoc.* 1923, i, 454; ⁷*Med. Science*, 1922, vi, 446; ⁸*Jour. Amer. Med. Assoc.* 1923, i, 1118; ⁹*Jour. Pathol. and Bacteriol.* 1923, 193; ¹⁰*Klin. Woch.* 1922, 1922; ¹¹*Arch. de Méd. des Enf.* 1923, 161; ¹²*Paris méd.* 1922, ii, 418; ¹³*Presse méd.* 1923, 336.

SCIATICA.

J. Ramsay Hunt, M.D.

TREATMENT.—Ott¹ presents the results of Epidural Injections. In a previous paper he reported the results in 34 cases of sciatica treated by removal of foci of infection and epidural injections of saline solution. Since then 14 other cases have been treated in a similar manner. The cases in which this method of treatment was used represent those in which the sciatic pain was not due to diabetes, syphilis, caudal tumour, or other common causes of so-called sciatica. Slight changes in the bone were found in certain cases, but in none could the changes be definitely shown to be the cause of the sciatica.

The technique of the injection is as follows: The armamentarium consists of a 20-c.c. Luer syringe with an ordinary spinal puncture-needle. The needle is introduced through the hiatus sacralis into the sacral canal for a distance of from 5 to 6 cm. Care should be used not to introduce the needle far enough to puncture the dura, the reflection of which takes place in most cases at about the upper margin of the second sacral vertebra. After the introduction of the needle, the trocar should be removed and suction with the syringe made, so that the operator may be sure that he has not punctured the subdural space. In case this happens, the needle should be withdrawn for from 2 to 3 cm. The solution used by the writer is, ordinarily, $\frac{1}{2}$ per cent novocain in physiological saline. The fluid is introduced slowly to prevent severe pain; $\frac{1}{2}$ c.c. is sufficient usually for one injection. If relief is not obtained, the injections may be repeated every forty-eight hours; sometimes seven or eight are required. It has been his experience that in most cases the first injection relieves the pain entirely for two to three hours and ameliorates it from two to ten days, but that usually one or two more injections are necessary for total relief.

Of the 48 patients treated by epidural injections, 19 had one injection, 14 had two injections, 9 had three, 6 had four; 14 patients were relieved completely and permanently, 18 were relieved partially so that they were able to return to work, 1 was relieved for one month, and 15 received no permanent benefit; 41 of the 48 patients obtained temporary relief—that is, relief lasting from two days to two weeks.

REFERENCE.—¹*Ann. of Surg.* 1922, Aug., 272.

SEBORRHOEA.

E. Graham Little, M.D., F.R.C.P.

This subject was discussed at a meeting of the British Medical Association,¹ and Cranston Low in the opening paper lays stress on the oily condition of the skin as the basic factor in all true seborrhœic eruptions, and the essential feature in diagnosis. He considers, in opposition to Sabouraud, that this is a non-microbic disorder, probably inherited. He attributes great importance to diet: fats, starches, and sugars should be avoided. Alcohol may stimulate sebaceous activity and so prove hurtful. Disorders of internal gland secretion probably play an important part in increasing oil secretion, as also do intestinal toxæmia and some forms of anæmia. Bodily heat, whether from exertion or clothing, has the same effect. The author has a most novel and interesting theory to explain the prevalence of seborrhœic alopecia in men, its rarity in women. He declares that the hair was meant to be long, and the normal stimulus to its growth is the "pull of the hair blowing in the wind", and he instances the abundant hair of the professional musician, which cannot be ascribed to their music, but to the fashion of wearing long hair. As an alternative explanation, he offers the suggestion that as men go much oftener to the barber they run more risk of infection of the scalp. Seborrhœic dermatitis of the body includes papular, papulo-vesicular, and vesicular lesions which end as scaly and crusted areas of yellowish-red colour, usually spreading peripherally, sometimes clearing up in the centre, and typically seen on the sternal and interscapular regions. They also favour the scalp, and spread down behind the ears on to the neck and in the axillæ and groins, etc. When large areas are affected, and the disease becomes chronic, it is tempting to invoke the theory of sensitization of the skin to the organisms of seborrhœa, amongst which the author would include Sabouraud's bacillus, the bottle bacillus, and *Staphylococcus epidermidis albus*. To no one of these three would he give the palm, and all three may be non-pathogenic.

Barber, who continued the discussion, considers that the basis of seborrhœa

is not so much the oily secretion as a chemical change which takes place in it. In this state the resistance of the skin to bacterial infection is weakened. The organisms which he would place first in importance are the *Staphylococcus aureus* or *albus*, the *acne bacillus*, and the *bottle bacillus*. He retains his opinion, published five years ago, that there is an underlying condition of acidosis. Blood-sugar in cases uncomplicated by pus infections was normal, but in chronic pyogenic examples the content was raised, averaging 0.2 or even 0.28 per cent. Excess of carbohydrate food which is imperfectly digested is the most probable source of this acidosis. As a corollary of these opinions he claims that the administration of large doses of Alkali without other treatment is specific in acute cases. In chronic pyogenic forms another element, that of sensitization, is to be assumed. The treatment in such cases should include Dieting as above, the Elimination of Septic Foci, and the giving of Autogenous Vaccines. Sodium Bicarbonate in full doses before meals, or Hydrochloric Acid after meals, may be advisable. For local treatment he recommends Sulphur, Salicylic Acid, Resorcin, the Mercurials, and X Rays.

REFERENCE.—¹*Brit. Med. Jour.* 1922, ii, 752.

SERUM SICKNESS.

J. D. Rolleston, M.D.

SYMPTOMS AND COMPLICATIONS.—R. H. Boots and H. F. Swift¹ state that among 10 patients with other symptoms of serum sickness following intravenous injection of antipneumococcal serum, such as fever, adenitis, urticaria, and transitory leucopenia followed by leucocytosis, 6 showed definite evidence of joint involvement. [This is an unusually high incidence of joint involvement in the serum disease. In a series of 1100 cases of diphtheria treated by serum under the reviewer's observation, the incidence of joint involvement was only 9.8 per cent.—J. D. R.]. In 4 out of 5 cases in which aspiration was performed, fluid was obtained with the gross and microscopical characters of an exudate, indicating that the arthritic symptoms in serum sickness are due to an actual inflammation of the joints. The presence of horse serum in the fluid in two cases suggested that the irritation of the joint might be due to the presence of this foreign protein in an allergic tissue.

J. A. Sicard and Cantaloube² record three cases of musculospiral paralysis which occurred in persons who had been injected with serum. In two cases prophylactic injections of antitetanic serum had been given for a wound, and in one case diphtheria antitoxin had been used for the treatment of diphtheria. The paralysis developed at the same time as the characteristic symptoms of the serum disease, such as cutaneous oedema, urticaria, and generalized pains, so that it was probably due to an inflammation originating in the connective tissue surrounding the nerve in the musculospiral groove. Although complete reaction of degeneration occurred in all three cases, recovery took place in the course of about twelve to eighteen months. No other cause but serum sickness could be incriminated.

F. W. Sumner³ reports a case of death from anaphylactic shock following prophylactic injection of 1000 units of antitoxin for diphtheria in a girl, age 8. The patient had never had a previous injection of any sort, and none of the other ten cases who received prophylactic injections at the same time had any anaphylactic symptoms. No autopsy was performed, but the patient was probably the subject of status lymphaticus, and could not tolerate the vicinity of horses. Similar cases have recently been recorded by Waugh (*see MEDICAL ANNUAL*, 1919, p. 385) and McCallum (*Ibid.* 1921, p. 407) following the curative and prophylactic use of serum. [The extreme rarity of fatal anaphylaxis is shown by the fact that the reviewer, in over 23 years' experience in large fever hospitals, has never seen an example.—J. D. R.].

PATHOLOGY.—According to W. H. Mainwaring, A. C. Beattie, and R. W. McBride,¹ the characteristic intestinal lesion in canine anaphylaxis is a stasis and marked œdema of the mucosa, followed by epithelial desquamation, hæmorrhage, and superficial necrosis during the later stages of the shock. The lesion is due to a prolonged contraction of the intestinal musculature, increasing the intra-intestinal pressure completely enough to stop the circulation in the mucosa during the period of low arterial blood-pressure.

PROPHYLAXIS.—R. Kraus,⁵ who alludes to his previous paper on the prevention of serum sickness by the use of ox serum (*see* MEDICAL ANNUAL, 1923, p. 413), states that if only a limited supply of ox serum is available, prophylactic injections against diphtheria or tetanus should consist of ox serum only, while for curative purposes the first injection should consist of ox serum and subsequent injections of horse serum, as serum sickness is less frequent when this plan is followed than when horse serum is given first and ox serum afterwards. The only drawback in the use of ox serum is that the ox does not supply such a large quantity of serum or antitoxin as the horse, but this can easily be remedied by concentration of the serum.

TREATMENT.—W. M. Crofton⁶ states that no one giving serum should fail to have Pituitary Extract or Adrenalin, or both, at hand in case of anaphylactic shock; 1 c.c. should be given at once, and repeated if the symptoms are not relieved in five or ten minutes. If the patient is already unconscious or moribund when first seen, 1 c.c. of adrenalin should be injected into the right ventricle. In cases of serum sickness with enormous œdema, 1 c.c. of pituitary extract or adrenalin solution should be given every two to four hours until it disappears.

REFERENCES.—¹*Jour. Amer. Med. Assoc.* 1923, i, 12; ²*Bull. et Mém. Soc. méd. Hôp. de Paris*, 1923, 1046; ³*Brit. Med. Jour.* 1923, i, 465; ⁴*Jour. Amer. Med. Assoc.* 1923, i, 1437; ⁵*Munch. med. Woch.* 1922, 1566; ⁶*Prescriber*, 1923, 233.

SEVEN-DAY FEVER, (*See* DENGUE.)

SKIN DISEASE IN CHILDREN.

E. Graham Little, M.D., F.R.C.P.

Gray¹ considers the treatment of a number of common ailments of the skin in children, in the order of the age at which they most often appear.

Miliaria Rubra, or Sweat Rash.—Occurs as small inflammatory vesicles, usually on covered parts, in children who are too warmly clothed. The treatment includes change of clothing and application of Calamine Lotion.

Napkin Eruptions.—Two conditions are described under this heading: an intertrigo of the flexures, where friction with opposing surfaces is largely responsible for the disorder; and a papular eruption common on the buttocks, thighs, and genitals, often mistaken for syphilis, from which it is distinguished by the absence of any constitutional or other evidence of that disease. Both forms of this disorder are treated by more careful replacement of napkins when they are wet, by Cleanliness, washing the parts with warm water without soap, drying with a soft towel, and using a mild powder such as equal parts of talc and zinc oxide. Or Calamine lotion or liniment may be used.

Pemphigus Neonatorum.—This is really a streptococcic impetigo of the newborn, usually appearing on the second or third day after birth as thin-walled vesicles which rapidly enlarge and produce excoriated areas sometimes over the whole body (Ritter's disease). The best treatment when seen early is to apply compresses of Acriflavine lotion, 1-1000, changed every four hours. When the surfaces affected are too large to risk the production of chill, a good application is a mixture of 5 gr. of Ammoniated Mercury to the ounce of calamine liniment, the surface being then covered with cotton-wool, and the dressings changed three times a day.

Infantile Eczema.—This is common after the third month, in cold weather, and in children overfed or too frequently fed. The disease begins on the cheeks or forehead, or scalp, is attended by much weeping and crusting, and is often very intractable. Treatment should be directed to modifying the diet and protecting the exposed parts. In early stages the best application is **Calamine Liniment**, to which 5 per cent **Ichthyol** may be added in some cases. In more acute conditions **Lead** or **Calamine Lotions** may be better tolerated. Crusts should be removed with boric starch poultices changed night and morning. Later, **Lassar's Paste**, with 2 to 5 per cent **Coal Tar**, may be used. Soap and water are to be religiously avoided. Scratching increases the congestion and must be prevented, either by tying the child down in its cot or by applying cardboard splints to the elbow to prevent flexion. Some of the cases of infantile eczema are probably a symptom of a severe toxic infection, and prognosis should be guarded.

Urticaria.—This is commoner in the summer, and may persist as a seasonal disease for years. Breast-fed children seldom suffer from it, and the most probable cause is gastro-intestinal irritation. The writer incriminates sugar, which he advises should be excluded, as well as other likely items such as bananas, eggs, meat extracts. The source of milk may be changed. He recommends, as internal remedies, **Hydrargyrum cum Creta**, **Sod. Bicarb.**, **Rhubarb**, **Salol**, **Ichthyol**; and, as applications, **Liquor Carbonis Baths**, **Lead Lotions**, **Tar** or **Calomel**, and **Soft Clothing**.

Impetigo Contagiosa.—This is primarily a streptococcic infection of exposed parts, commencing as a blister, which rapidly breaks and forms crusts. Occasionally the vesication spreads in a ring, while the centre heals—*impetigo circinata*. In the folds of the skin fissures may form which are often difficult to heal. Treatment must begin with removal of crusts with compresses of warm oil or hot water or with starch poultices. Then a 3 per cent **Mercurial Ointment** may be used. Where there is much discharge, **Acriflavine Lotion**, 1-1000, is an excellent dressing.

The author classes as *eczema* the discoid patches of chronic scaly dermatitis often seen on the face of children. This form of eruption is frequently regarded as an indolent *impetigo*, and ascribed to a streptococcic infection. Others regard it as the sequel of dribbling in children who suffer from nasopharyngeal obstruction, and attention to this possible cause is recommended. Some cases seem to be due to the use of strong soaps, and this possibility must be kept in view. The application of 3 per cent **Salicylic Acid** in cold cream is recommended. Some cases of *impetiginous eczema* are seen affecting the neighbourhood of the nostrils and ears, and are due to discharges from those cavities. The cause must of course be sought and, if possible, treated. For example, in nasal cases adenoids may be present and ought to be removed. Compresses of 1-1000 **acriflavine**, or applications of **calamine liniment** with 2 to 3 per cent **ammoniated mercury**, may be used, or small weeping patches may be painted with 2 per cent **silver nitrate** in spirits of nitrous ether. *Flexural eczema* is common in children, and is probably of the same nature as *pruritic lichenification* in adults. The author recommends in early cases **X rays** and **occlusive dressings**, or other **antipruritic remedies**.

Ringworm.—This disease is carefully considered by the author, and the useful warning is given that no scalp should be diagnosed as simply scurfy without excluding fungus disease as a cause. **X Rays** are recommended as the best treatment; or, if this is objected to, an attempt may be made to loosen the hairs by rubbing in an **Irritating Ointment**, e.g., equal parts of common salt and vaseline. Ringworm of the smooth skin is best treated by rubbing in **Whitfield's Ointment** (acid. salicyl. 15 gr., acid. benzoic. 25 gr.,

vaseline 1 oz.). When ringworm infects the nails, the best treatment is to remove the nail and dress the base with **Weak Mercurial Ointments**.

Pediculosis Capitis.—This infection may be troublesome, especially in girls. The treatment recommended is application of hot flannel compresses soaked in 1-40 **Carbolic Acid Lotion** and kept applied for an hour.

Scabies.—In children there is a somewhat special distribution of lesions about the feet, and septic infections are common. In infants an ointment consisting of equal parts of **Balsam of Peru** and **Sulphur** may be rubbed into the skin after the bath, and continued for a week. Disinfection of clothing and inspection of other members of the family should be insisted on.

Infantile Eczema.—The following directions are given by Charles White² :—

1. The baby is not to be taken out of doors, but is to be kept in a room with a southerly or westerly exposure. The heat is to be turned on, the window to be open day and night, and a screen to be so arranged that neither wind nor sun shall strike the baby.

2. When the baby is to be fed or bathed, or its clothes are to be changed, it is to be taken to an adjoining warm room and returned as soon as possible afterwards. Wet or soiled diapers must be changed at once.

3. Care must be taken that the baby is not too warmly dressed. Overheating congests the skin and consequently increases the itching, one of the great hindrances to a rapid cure. Rubber diapers must not be worn.

4. If the baby shows any desire to scratch, the sleeves of the nightdress must be firmly attached with a strong safety pin to the diapers. The widely-advertised aluminium mits can do much harm, and the stiff elbow-joint cuffs do not prevent the use of the straight arm as a scratcher.

5. No soap or water should touch the eczematized skin, but the unaffected portions of the body may and should be bathed daily with tepid starch-water, and, if necessary, a superfatted cold-cream soap may be used.

6. No change in the diet is to be made at the first visit.

7. Night and morning, the following paste should be applied to the diseased skin, care being taken that the paste is black and never olive green: **Crude Coal Tar** and **Zinc Oxide**, 2 parts each; corn starch and petrolatum, 16 parts each. The paste should be buttered on with a wooden throat-stick and never bandaged. Before each application, all remnants of the previous inunction should be removed with sterilized gauze wet with olive oil, and the fresh ointment applied immediately afterwards.

If these measures fail, the author advises an examination of the stool. Abnormal stools are the rule in obstinate cases; excessive fat was found in 60 per cent, excess of starch in 40 per cent, excess of sugar in 20 per cent, excess of protein in 10 per cent. Diet should be rectified in accordance with these findings.

In the discussion which followed, Sutton called attention to the value of **Pusey's Emulsion** in cleansing these cases. Its formula is: powdered tragacanth, 1 drachm; glycerin, phenol, and oil of bergamot, each 5 min.; olive oil, 4 oz.; and water, sufficient to make 1 pint.

Schamberg was inclined to incriminate milk as a probable contributory cause, the period of greatest eruption corresponding with the period when the child is fed on a pure milk diet. Other authors brought out the point that the diet of the mother should be carefully investigated when she is suckling her child. Beer and stout are often prescribed for nursing mothers, and are apt to disturb the suckling.

A detailed study of this excellent paper is to be recommended.

REFERENCES.—¹*Practitioner*. 1922, July, 67; ²*Arch. of Dermatol. and Syph.* 1923, Jan., 50.

SKIN DISEASES, GENERAL THERAPEUTICS.

E. Graham Little, M.D., F.R.C.P.

Carbon Arc Lamps.—Sequeira¹ makes an interesting report of his experience in treating *lupus vulgaris* by carbon arc lamps. Exposure of a large surface of the body greatly increases the recuperative power of the patient and in this way aids recovery from lupus, which may be treated locally by concentrated light as well. The method is particularly valuable in cases which have resisted local treatment, whether by light or otherwise. The method was to suspend a 50-ampère lamp about three feet from the ground in a room, and to seat the patients, clad only in bathing drawers, round it. The eyes must be protected by shields from exposure to the light. The sittings are of half an hour's duration to begin with, and are extended until both anterior and posterior surfaces are exposed for two hours. Screens are placed round the patients so as to exclude draught. It has been found by experience that actual lesions are irritated by the light, and they must be covered up. Effects already observed are encouraging: the first result is intense pigmentation of the whole surface, increase of body weight, improvement in general condition and spirits of the patient, and rapid healing, especially of the moist lesions. The carbon arc light probably gives a spectrum more like that of sunlight than any other. The cost of installation is not prohibitive, and varies with the electric installations available.

Lomholt² has experimented with carbon arc (Finsen) light in the treatment of chronic *eczema*, and reports very encouraging results. Forty cases which had proved remarkably obstinate to other measures, some of them belonging to the type usually classed as neurodermite, were treated, and it is claimed that a practically complete cure was obtained in almost every case. Acute or weeping *eczema* did not do quite so well.

Ultra-violet Light.—Oliver³ has an excellent article on the use of ultra-violet light in dermatology. Two makes of lamp are used. In one the source of light is cooled by water (the Kromayer type) and the quartz glass can be pressed directly on the skin to be treated; for intensive effect on small areas this is the method of choice. The other type is cooled by air; larger surfaces may be treated, but the lamp gets so hot that it must be kept at least six inches from the site to be treated. The conditions in which the author has found most benefit are set forth. *Ulcers* dependent on poor peripheral circulation are especially amenable to it. *Birth-marks* may be treated by the water-cooled form. *Alopecia areata* at times seems to respond very successfully. *Psoriasis* may be cleared by this agency, but recurrences are frequent. Chronic *eczema* in localized patches was benefited by short applications of water-cooled lamps. *Acne vulgaris* is best treated by the air-cooled form. *Lupus vulgaris* does well with ten-minute to half-hour pressures with the water-cooled glass. In *lupus erythematosus* light treatment is best avoided.

Oliver⁴ had beneficial results in five cases of typical *erythema induratum* in young women treated by the Kromayer lamp, firm pressure against the indurated areas being kept up for one to two minutes. Healthy skin should be protected from the lamp by interposing paper or plaster. In the five cases treated, induration had disappeared within four to six weeks after one application. In the discussion which followed the reading of this paper, X-raying was suggested as being equally effective, but violet rays are to be preferred as safer.

Radium.—Bryant⁵ gives his experience of 146 cases of skin disease treated by radium: 128 of these were classified as *epithelioma*, 12 as *keloid*, and 6 as *lupus*. It is claimed that all except five of the *epithelioma* cases did well. The radium was used almost exclusively unscreened, the usual dose being

150 mgrm.-hours. Where the cartilage of the ear is affected, the mildest doses only are to be used. In keloid, on the other hand, full doses are required, sufficient to cause a marked reaction or even breaking down or ulceration.

Diathermy.—Vibede⁶ reports encouraging success with diathermy in obstinate *lupus vulgaris*. The duration of treatment averaged less than a month, and 82 per cent of cures are claimed. The disadvantage of the method is the cost of the apparatus and the pain caused by treatment, which usually requires the accompaniment of a general anæsthetic.

Turpentine.—Levin and Rose⁷ have applied turpentine in the treatment of a large variety of skin diseases during the past year, and record their experience, chiefly in diseases presumed to be infective but where the cause is not known, as for example *psoriasis* and *pemphigus*. After some trials the following formula was preferred by the authors: 15 per cent rectified turpentine, with $\frac{1}{3}$ per cent each of anæsthesin and quinine hydrochloride, in olive oil. Half to one c.c. of this solution was administered every four to seven days to adults, 1 to 2 min. weekly for infants and children up to the age of five, and 4 min. every four to seven days for older children. The treatment is said to be particularly useful for pyogenic infections, especially when deep seated, such as *boils*, *sycosis*, *erysipelas*, and *abscesses*. In *sycosis* especially, it seemed to be preferable to other treatments, but there is no reason why X-ray therapy should not be applied as well in this obstinate affection.

REFERENCES.—¹*Brit. Jour. Dermatol.* 1923, March, 93; ²*Lancet*, 1923, i, 1326; ³*Jour. Amer. Med. Assoc.* 1922, Aug. 19, 625; ⁴*Arch. of Dermatol. and Syph.* 1922, Nov., 619; ⁵*Ibid.* 803; ⁶*Lancet*, 1923, i, 966; ⁷*Arch. of Dermatol. and Syph.* 1922, Nov., 584.

SKIN, PIGMENTATION OF.

E. Graham Little, M.D., F.R.C.P.

Kromayer¹ recommends a method for removal of small pigmented areas in the skin. A dental burr of the proper size is chosen, and rotated upon the spot to be removed, anæsthesia by freezing or local infiltration being used according to the size of the area. The small excoriation so produced is dressed with sterilized cotton-wool, which sticks to the surface, dries, and forms an artificial scab which drops off in about ten to fourteen days.

REFERENCE.—¹*Jour. Amer. Med. Assoc.* 1922, July 15, 250.

SKIN, TUBERCULOUS CHANCRE OF.

E. Graham Little, M.D., F.R.C.P.

Nixon and Rendle Short¹ draw attention to a form of tuberculous inoculation which simulates a hard syphilitic sore. In certain individuals direct implantation of tubercle bacilli into the skin by means of a cut or abrasion gives rise to a localized indurated papule. This papule develops into a small indolent ulcer of cartilaginous consistency, having an edge that is slightly ramparted and translucent. It is attended by enlargement of the nearest group of lymphatic glands, which may be mistaken for a sentinel bubo. The induration of the ulcer causes it to be mistaken for extra-genital chancre, although syphilitic chancres of the skin are usually not indurated, but assume a raspberry appearance which the tuberculous ulcer never possesses. Sometimes the tuberculous ulcer may look exceedingly like rodent ulcer; but in the latter case there is an absence of glandular enlargement.

The explanation is given that these lesions are the result of inoculation of tubercle bacilli into a patient who has a latent tuberculous affection, and the necrosis is an effort of the tissues to expel the bacilli where they have lodged. This reaction is known as Koch's phenomenon. The authors describe four cases, in all of which excision was ultimately practised and tuberculosis demonstrated as the cause.

REFERENCE.—¹*Brit. Jour. Surg.* 1922, July, 44.

SKULL, FRACTURES OF. (See CRANIAL SURGERY.)

SMALL-POX. (See also VACCINATION.)

J. D. Rolleston, M.D.

EPIDEMIOLOGY.—F. R. Blaxall¹ states that in 1922 there were two distinct epidemics of small-pox in England, one in the North and the other in London. The epidemic in the North, in which three regions—Nottingham, Doncaster and the West Riding of Yorkshire, and Middlesbrough—were affected, was remarkable for the large number of cases (821) and its low virulence (3 deaths), whereas the London epidemic, in which comparatively few persons (74) were attacked, had a relatively high death-rate, viz., 24 fatal cases, or a mortality of 32.4 per cent. In the northern epidemic the majority of cases occurred in unvaccinated persons or in adults who had been vaccinated in infancy only. Of the 3 fatal cases, 2 were unvaccinated children and 1 an unvaccinated adult, age 32. Of the 74 London cases, 54 had been vaccinated and 20 had not been vaccinated. Of the fatal cases, 11 had been vaccinated and 13 had not, or showed no evidence of vaccination.

According to P. Teissier,² during the Franco-Prussian war, which lasted only six months, 200,000 French soldiers contracted small-pox and 25,470 succumbed, while in the civilian population of Paris there were another 200,000 cases, with 18,000 deaths; whereas in the Great War, in spite of all the favourable circumstances for the spread of an epidemic, there were only 26 cases in the French army, mostly among Algerian, Moroccan, or Madagascan soldiers, who had escaped vaccination at the time of embarkation, and 44 cases among Colonial troops. Had small-pox occurred on the same scale in 1914–18 as in 1870–71, there would have been nearly 1,200,000 cases with more than 200,000 deaths in the French army alone.

H. A. Gins³ has drawn up the following table of the percentage mortality of small-pox in Berlin from 1758 to 1917, to show that a complete change has taken place in the age-incidence as the result of vaccination: small-pox, which was formerly a disease of children, being now one of middle age:—

Age	1758-74	1870-72	1916-17
Above 40	0.07	25.85	90.56
39-12 ..	1.25	27.13	7.32
Below 12 ..	98.70	49.02	2.12

According to a recent editorial,⁴ the virulence that small-pox displayed in parts of the United States and of Canada in 1921 was more than maintained in 1922, when there were 495 deaths among 9936 cases reported in 276 cities. The case-mortality was therefore 5 per cent, whereas it was 1 per cent in a much larger number of cases (31,489) in 1921. The case-mortality for 1921 in 92 cities was six times what it was in 1920, and in 1922 it was five times what it was in 1921.

S. B. Jones⁵ reports an outbreak of 23 cases of small-pox in Anguilla, B.W.I., in which the symptoms were those of modified variola. No fatal cases occurred. The absence of conscientious objectors, the loyal co-operation of the whole population, and the vaccination of all the inhabitants enabled the epidemic to be stamped out in six weeks.

SYMPTOMS.—J. H. Garrett,⁶ Medical Officer of Health for Cheltenham, who draws attention to the recent prevalence of *mild small-pox* in South Yorkshire, Derbyshire, and Gloucestershire, gives the following clinical description of the

disease. At the onset there may be a rise of temperature, aching of limbs and head, more rarely of the back, vomiting or nausea, and nasal catarrh. The complaint at this stage is likely to be mistaken for a bilious attack, a cold, or influenza. In two or three days the symptoms subside, the patient feels better, and perhaps goes out of doors until the rash is observed some time between the third and seventh day from the onset. In the mildest cases no preliminary illness is noticeable, and nothing is suspected until the rash appears. The distribution of the lesions is chiefly on the limbs, especially the wrists, hands, ankles, and feet, even affecting the soles and palms. The rash may be scattered over the body and face as well, but is not likely to extend much up the sides to the axillæ. The individual lesions are small and pearl-like. Either the papular or vesicular stage may fail to appear, and there may be only small elevations that immediately become purulent. They are often rather deeply seated in the cutis, and are several days in reaching full development, and many more in disappearing. Some do not quite reach the surface to dry up and be shed there, but disappear very gradually by absorption. The pock marks, when they occur, are shallow and tend to disappear. There are few permanent scars, and frequently none at all.

DIAGNOSIS.—Garrett points out that recent vaccination is of great assistance for immediate diagnosis. An undoubted prior attack of chicken-pox also assists in excluding the likelihood of that disease. (*See also CHICKEN-POX.*)

TREATMENT.—P. Romeo⁷ has treated cases of small-pox in adults by exposure to the Violet Ray. Three lamps of 110 voltage each were placed in a stand 5 to 9 in. from the surface of the body, which was completely exposed from the head to the feet. Not only did the treatment produce considerable relief, but, if applied before pustulation occurred, it almost completely prevented pock-marking. The earlier the treatment was used, the shorter was the course of the disease, and the milder were the constitutional symptoms.

H. C. Sinderson⁸ found that in children Daily Inunctions with an oily preparation consisting of 0·1 per cent arachis, eucalyptus, and carbolic acid proved very satisfactory in all stages of the disease, and eliminated to some extent the unpleasant odour. In adults weak applications of Tincture of Iodine were used in the early stages with good results, and the oily preparation mentioned during the scabbing stages. No perceptible advantage was derived from red-light therapy.

A. Balfour⁹ emphasizes the value of Permanganate of Potash, which was introduced by Dreyer, of Cairo, in 1910. Its good results are probably due to its germicidal and oxidizing powers. If employed early, it lessens the suppurative process, and consequently reduces the pitting of the skin, prevents complications, the formation of bed-sores, and the occurrence of general sepsis. The technique consists in painting the whole body with a freshly prepared saturated solution (5 per cent) of permanganate of potash on admission to hospital, and applying the same solution on each successive day unless the skin is too sensitive, when a weaker solution, such as 1·5 per cent, may be applied.

REFERENCES.—¹*Bull. de l'Acad. de Méd.* 1923, i, 146; ²*Ibid.* 111; ³*Med. Klin.* 1922, 1483; ⁴*Jour. Amer. Med. Assoc.* 1923, i, 1525; ⁵*Jour. Trop. Med. and Hygiene*, 1922, 321; ⁶*Lancet*, 1923, i, 1254; ⁷*Boston Med. and Surg. Jour.* 1922, ii, 215; ⁸*Edin. Med. Jour.* 1922, ii, 18; ⁹*Lancet*, 1922, ii, 1193.

SOFT CHANCER. (*See CHANCER, SOFT.*)

SPINAL CORD, WOUNDS OF. (*See PARAPLEGIA, TRAUMATIC.*)

SPINAL SURGERY.

J. Ramsay Hunt, M.D.

DISLOCATION OF THE SPINE.

Lateral Dislocation in the Lumbar Spine.—J. N. J. Hartley¹ states that pure dislocation in the lumbar spine is very rare. Undoubted cases, however, proved by post-mortem examination, have from time to time been recorded, and amongst these are to be found examples of all possible varieties—forward, backward, and lateral. The lateral dislocation is by far the rarest type.

The case recorded by Hartley is further proof of the possibility of uncomplicated lateral dislocation in this region of the spine, and the case is all the more worthy of record inasmuch as reduction was effected by manipulation at open operation.

As to the mechanical factors involved in its production, one must presume that, contrary to what is usual, the strong ligaments binding together the spinous processes and neural arches of the vertebræ yielded to the strain prior to the crushing of the cancellous bone tissue of the bodies of the vertebræ. The articular processes would thereby be disengaged, and rotation of the spine at the time of injury, or possibly the traumatic force being applied obliquely, may have produced lateral displacement. The contraction of the spinal muscles, or simply the weight being removed and the patient being placed in the horizontal position, would then cause interlocking of the displaced articular processes.

The treatment recommended for spinal dislocations by most authorities has been traction, torsion, and local pressure on the spinous processes; but, at the best, such must be a hazardous procedure. Any temporary exaggeration of the displacement may cause irreparable damage to the spinal contents. In the case here recorded, the exposure of the neural arches with their articular processes undoubtedly minimized the risks and facilitated reduction.

TUMOURS OF THE SPINAL CORD.

Frazier and Spiller² analyse 14 consecutive cases of spinal-cord tumour. While tumours of the spinal cord are less frequent than brain tumours, in the ratio of 1 to 6, the proportion of operable tumours of the cord, from the standpoint of localization and feasibility of exposure and removal, is far greater. In 12 of the 14 cases the tumour was accurately localized, accessible, well encapsulated, and distinctly an operable lesion.

DIAGNOSIS.—Fully cognizant of the fact that occasionally spinal-cord tumours run a painless course, in this series, in 13 out of 14 cases, not only was pain a conspicuous symptom, but in each of these 13 cases it was the first symptom. While in later stages pain may be referred to a more widespread distribution, the original pain zone continues throughout the course of the disease, and is therefore an important localizing sign when the time comes to determine the seat of the growth. Of interest, too, is the length of time which elapses between the onset of pain and the first signs of motor impairment. In 4, or one-third of the cases, three or more years elapsed, and in 3, or one-quarter of the cases, approximately two years elapsed. Pain is of outstanding importance as a warning signal in spinal-cord tumours. Not only are erroneous diagnoses made, but many needless operations are performed, especially when pain is referred to the upper or lower quadrant of the abdomen. According to the location of the tumour, the most common diagnostic errors are: pain associated with movements of the neck—Pott's disease; pain referred to the shoulder—rheumatism; pain referred to the shoulder and arm—neuritis; pain referred to the precordium—angina pectoris pain referred

to the upper abdomen—gall-stones; pain referred to the lower abdomen—appendicitis; pain referred to the lower extremities—sciatica.

Subjective sensory disturbance is invariably the second symptom. These paræsthesias are variously described as a sense of numbness or sleepiness in the limbs, itching, tingling, and a sense of constriction about the limb or trunk. There is, however, a distinction in the distribution of pain and paræsthesia, in that pain, a root phenomenon, is always referred to the same side as that of the lesion, while the paræsthesia, a cord-pressure symptom, may be homolateral, contralateral, or sometimes bilateral.

Motor disturbances were present in each of the 14 cases in greater or less degree, according to the size and location of the tumour. In only 2 of the series was there a disability of the upper extremity, and of the remaining 12 cases, in one-half both lower extremities were involved, and in one-half only one lower extremity.

Too much stress must not be laid on the presence of a *spinal block*. It is a late rather than an early symptom. Xanthochromia was present in only 5 cases, and in those the duration was five, three, and two years. The Queckenstedt or Ayer test for a spinal block should be applied in all cases, and may reveal a block before xanthochromia appears.

SEGMENTAL DIAGNOSIS.—Once the presence of tumour is presumed, its accurate localization is an essential preliminary to exploration. In the order of their importance the writers have found the following of the greatest assistance: (1) Level of sensory loss or impairment; (2) Point of referred pain; (3) Sympathetic phenomena; (4) Absent reflex; (5) Muscular atrophy.

SURGICAL ASPECTS.—There are two points in technique to which reference may be made. When mistakes are made in the attempt to expose the tumour, the opening in the spinal column is invariably too low, and to find the tumour the operator must enlarge the opening upward. To avoid this error they advise this rule: The level of the lowest lamina to be removed should correspond with the location of the segment representing the highest level of sensory loss.

The second point has to do with the prevention of recurrence. Endotheliomas grow from the spinal meninges, and in most instances one can readily see at the operation the point of origin, usually on the lateral aspect of the spinal canal, often near the intervertebral foramen, and sometimes within the canal. Therefore, in removing the tumour, the operator should remove with it that portion of the meninges from which the tumour originated.

Elsberg and Stookey³ discuss the mechanical effects of tumours of the spinal cord, and their influence on symptomatology and diagnosis. All growths on the posterior aspect of the cord, whether in the median line or lateral, but behind the posterior nerve-roots, are classified as posterior growths. Those lying on the lateral aspect of the cord in front of the posterior roots, but behind the dentate ligament, are dorsolateral growths. Those which are lateral in front of the dentate ligament, but behind the anterior roots, are ventrolateral growths. Those that lie on the anterior aspect of the cord, in the median line, or more toward the side, but in front of the anterior roots, are anterior or ventral growths.

In their series of cases, 64 per cent of the growths were dorsal or dorsolateral, and 36 per cent were ventral or ventrolateral.

While pain is often absent, there are very few cases without some type of sensory disturbance as an early symptom. In cases of ventral and ventrolateral growths, subjective paræsthesia is very frequent.

Tumours that lie on the ventrolateral or dorsolateral aspect of the cord are much more apt to give an early Brown-Séquard type of motor and sensory disturbance than tumours in other locations. If the disease began with root

pains, the tumour usually was dorsolateral; if, on the other hand, early root pains did not occur, but there were early contralateral paræsthesias, the growth usually lay on the ventrolateral aspect of the cord.

The mobility of the cord at various levels has a decided influence on the symptoms and signs of an expanding lesion within the spinal canal.

RELATION OF TUMOURS TO THE SURFACE OF THE CORD (NOT INCLUDING THOSE BETWEEN THE ROOTS OF THE CAUDA EQUINA).

Location	Extramedullary	Extradural
Anterior and median ..	1	1
Anterior and lateral ..	5	4
Anterolateral ..	6	2
Posterior and median ..	1	0
Posterior and lateral ..	18	3
Posterolateral ..	8	3
Lateral and posterior ..	1	0
Lateral or around the cord	1	1
Total ..	41	14

SENSORY SYMPTOMS AT ONSET.

Symptoms	Extra-medullary	Extradural	Conus and Cauda	Intra-medullary
Root pains ..	19	3	0	2
Pain in back or neck ..	6	4	1	4
Pain in back, extending down limbs ..	1	2	7	0
Pain in homolateral limb below level ..	1	1	0	0
Pain in contralateral limb below level ..	2	1	0	0
Pain in both legs below level ..	2	0	2	0
Pain in rectum ..	1	0	1	0
Pain in chest or abdomen ..	2	2	0	1
Tingling, burning, heaviness, pin-and-needle sensation or numbness, homolateral limb below level ..	1	0	0	4
Tingling, burning, heaviness, pin-and-needle sensation or numbness, contralateral limb below level ..	5	0	0	0
Tingling or numbness, both lower limbs ..	3	0	0	2
Tingling without pain on same side ..	1	0	0	0
Tingling without pain on opposite side ..	2	0	0	0
Numbness or heaviness, no pain ..	1	1	0	0
Feeling of stiffness, no pain ..	1	0	0	0
No sensory symptoms ..	1	0	2	2

The 'reversed Brown-Séquard' syndrome was noted in six cases operated on. This is explained as follows: When the growth has reached a certain size, and before actual pressure on the cord by the tumour has occurred, the cord has changed its position and lies against the dura and the bony wall of the canal on the side opposite that of the tumour.

In ten of the patients the symptoms and signs of the spinal compression were aggravated after fluid had been withdrawn by lumbar puncture.

REFERENCES.—¹*Edin. Med. Jour.* 1922, July, 34; ²*Jour. Amer. Med. Assoc.* 1922, Sept. 23, 1924; ³*Surg. Gynecol. and Obst.* 1923, March, 177, and *Arch. of Neurol. and Psychiat.* 1922, viii, 502.

SPINE, TUBERCULOSIS OF. (See POTT'S DISEASE.)

SPLEEN, SURGERY OF.*E. Wyllys Andrews, M.D., F.A.C.S.*

Splenectomy.—The indications for removal of the spleen have always been a matter of considerable dispute. Morawitz¹ says that the best results have been achieved in cases of hæmolytic jaundice. In this disease the spleen is probably the one offending pathologic agent, and the cure of the icterus seems to be absolute and indisputable. Microscopic examination of spleens removed seems to show that they are very actively engaged in the destruction of erythrocytes. Banti's disease and certain cases of hypertrophic cirrhosis of the liver also will often be markedly improved after splenectomy. As to primary anæmia, one must decide on the basis of each individual case. If this really is a clinical entity, or if several diseases are included under this term, cannot yet be answered. Certainly the reaction to spleen removal is very different in different types of cases. The author thinks that as a routine such a procedure is wrong, as it only offers the hope of a temporary remission. In many cases, however, where the blood destruction seems to be the predominant process and where the spleen is enlarged, its removal may be of value. Certainly it can do no good in the aplastic anæmias. Removal of the leukæmic spleen has brought only disappointment. Radiation will cure the splenic tumour almost as promptly. In polycythæmia the results have been poor, and the mortality very high.

Carslaw² agrees that the best results are attained in hæmolytic icterus. The mere finding of splenomegaly is not an indication for splenectomy. Malarial and syphilitic spleens are not surgical, although rupture of such large diseased organs may necessitate it. He reports one enormous spleen removed in which tuberculosis was found quite unexpectedly. In splenic anæmia he also believes that operation is advisable, and says that the results have been good, especially in the early cases before the liver was too much involved.

Kettle³ calls attention to the fact that it has been shown experimentally that removal of the spleen causes a temporary anæmia of slight degree which is very constantly followed by a permanent increase in the red cells. More important still, in animals whose spleen has been excised there is a marked resistance of the red cells to all hæmolytic agents. This can also be demonstrated in living animals from whom the spleen has been removed, for they require two or three times the dose of a hæmolytic agent such as saponin or hypertonic salt solution to produce hæmoglobinuria as a normal animal does.

Lombard⁴ discusses the removal of the adherent spleen. He believes that often the adhesions are not inflammatory, but simply the result of the normal process of the fusion of the two folds of peritoneum being carried too far. Access is gained by a left rectus incision, to which is added a transverse cut to the left. If adhesions prevent the delivery of the spleen, he advocates ligation of the pedicle with the spleen *in situ*, and then making an incision in its capsule and removing the pulp from within.

REFERENCES.—¹*Berlin. klin. Woch.* 1922, April 15; ²*Brit. Med. Jour.* 1922, Dec. 23; ³*Ibid.*; ⁴*Presse méd.* 1923, Feb. 10.

SPORTS INJURIES.*Sir W. I. de C. Wheeler, F.R.C.S.I.*

Under this heading Romer¹ discusses such conditions as tennis calf, golf elbow, housemaid's knee, etc. He looks on the subject from the human point of view. The patients are, for the most part, young and healthy. He says the attitude of "do nothing but rest and quiet" is to be avoided, and every attempt made to get the patient sound quickly. The pain in ordinary cases of sprain or traumatic synovitis is due, he thinks, to the pressure caused by the exudation on the sensory nerves. Gentle massage combined with heat in the form of hot fomentations which, by dilating the capillaries, relieve

tension, are the best first-aid remedies for pain. In the very early stages application of cold contracts the blood-vessels and prevents further exudation. Movement of the damaged part can be restricted by bandages or intelligently applied adhesive plaster.

Tennis or Golf Elbow.—The condition may also be produced by fly-fishing, weeding, fencing, and the use of a heavy coaching whip. The most common variety is something in the nature of tenosynovitis set up in the muscles round the elbow-joint. Traumatic fibrositis conveys the idea better, as the muscles in this region lack a tendon and investing sheath. The external condyle, with its muscular attachments, is the most usual situation; the muscles mostly at fault would appear to be the supinator longus and extensor communis digitorum, which become affected by such actions as back-handed play at tennis. He thinks a large-handed tennis racket is as productive of over-strained muscles as playing with too heavy a racket. Pain on the inner condyle is produced by approach shots at golf, or playing with a cut at tennis, etc.

In a second type of case there is an actual periostitis at the attachment of muscles, or pain may be produced by a simple arthritis in the radio-ulnar joint. In the simple types, pain can usually be elicited by pressure over the affected area, and is produced by small actions, such as pouring out tea, tying a bow tie, brushing the teeth, etc., but direct pulling or lifting of heavy weights can be accomplished without discomfort. These troubles can be relieved or cured by massage of the affected muscles, and abstention for about ten days from playing those games which caused the trouble. The forearm ought to be strapped, with the double object of supporting the muscle and, at the same time, checking the pull on the condyle. The most satisfactory way of doing this is to cut two strips of adhesive plaster about $1\frac{1}{2}$ in. wide; the first should encircle the forearm at the junction of the upper and middle third; the second piece is folded on itself and a semicircle cut from it; this is attached so as to overlap the first by a small margin, whilst the opening made by the removal of the semicircle enables the support to cover the forearm up to the joint completely, without interfering with flexion. When putting the plaster

on, see that the elbow is semiflexed and supinated, and that the muscles of the forearm are relaxed. With the strapping properly attached, play can once more be resumed. When the radio-ulnar articulation is affected, swelling and pain over the head of the radius will be found. Recovery may be slow. Ionization appears to hold out the best prospects in delayed cases.

Sometimes it is a small bursa beneath the conjoint tendon over the radio-humeral joint which becomes inflamed.

The bursa lies between the tendon and the tip of the epicondyle. The operative removal of the bursa has been followed by success. The bursa can be exposed through a split in the conjoint tendon as it lies in its position between the radial head and the epicondyle (Fig. 80).

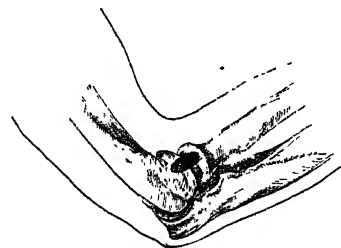


Fig. 80.—Location of bursa over radiohumeral joint in tennis elbow (Osgood).

Rider's Strain.—Overstrain of the adductor muscles is often produced by the sudden swerve of the horse when jumping or galloping. Any attempt to grip the saddle with the knees is rendered abortive from the pain produced. Examination may reveal a small groove in the damaged muscle. Ecchymosis is often excessive, and in severe cases will extend down the whole length of

the thigh. Inefficient treatment leads to a tendency to recurrence month after month and season after season. The most satisfactory treatment is skilled massage to obtain absorption of the extravasated blood and lymph. Massage for ten days is usually sufficient. After this, the thigh should be strapped by means of adhesive plaster. Three strips are cut of sufficient length to encompass the thigh, and about 2 in. in breadth, applied in an overlapping fashion from below upwards. The last strip should fit well into the fork, but should not chafe the fold of the buttock. Riding may now be tried, but it is wiser at first to limit this to quiet hacking. The strapping requires renewal in four or five days. Jumping may now be permitted, but as an added precaution against undue strain the stirrup-leathers should be shortened by one or two holes. The strapping should be renewed from time to time until all pain during or after hunting has disappeared. In the later stages a 'Salmon' riding belt can be substituted for the adhesive plaster.

In chronic cases, the adductor muscles may need to be stretched under an anæsthetic, and it is well to have a radiograph taken to eliminate rider's bone (myositis ossificans).

Lawn-tennis Calf.—All surgeons are familiar with the symptoms of a sudden rupture of the plantaris muscle, and the sharp pain as if the victim has been hit by a stick or a whip from behind. The treatment consists in supporting the calf muscles by means of adhesive plaster of sufficient length to encircle the leg. Starting just above the ankle-joint, the strapping is carried to just below the knee. Each strip should start from behind forwards so that the ends fall over the front of the shin. Immediate use of the limb is essential to rapidity of cure. The pain, though disagreeable to the patient, is harmless to the leg. The plaster should be renewed at the end of the third day. Complete recovery can be anticipated within three weeks.

Cricket Injuries.—The long head of the biceps may be strained in bowling or throwing. Radiant heat and massage are beneficial. The joint can be supported by adhesive plaster encircling the shoulder-joint and shaped to fit the axilla. With the arm raised to a right angle, a pad of cotton-wool is placed in the axilla with a view to prevent the plaster causing chafing, and the plaster is brought firmly round the joint.

Cricket is also responsible for the production of an injury which has received the cognomen of 'dropped top', the condition which, in America, receives the title of 'baseball finger'. It arises from a sudden blow on the tip of the outstretched finger; the extensor tendon is split or partially torn. Massage is again recommended by Romer, and doubt is expressed as to the results of rest on a splint in the extended position. [The reviewer has many times treated this condition on one of Jones's light aluminium finger-splints, applied to the finger by two or three encircling pieces of adhesive plaster. It appears to him that the great desideratum is to allow the tendon to heal with the finger in extension, and that massage, if employed at all, should be employed late.—[W. I. de C. W.]

Cricket is also responsible for a sprain or tear of the oblique abdominal muscles. The treatment recommended is that of the late Dr. Wharton Hood—'rub and strap'. The flank should be strapped in the same way as is adopted for fractured ribs, the patient leaning well to the affected side.

Injuries to the Knee-joint.—These are very numerous, but assuming that there is acute synovitis without internal derangement, it is occasionally advisable to aspirate the joint in the commencement of treatment. Light massage with the knee supported on a pillow in bed promotes absorption of fluid. When the effusion has subsided, the patient should be encouraged to move about, supported by strapping or a firm bandage. Romer thinks that many cases

of recurrent synovitis of the knee-joint are entirely due to the want of natural support owing to wasting of muscles.

Tenosynovitis of the Tendo Achillis is often set up through the habit of tying the laces of the boot too tightly around the ankle.

Rupture of the Long Head of the Biceps (Arm).—Ludington² draws attention to this condition and refers to its frequency. Sometimes the tendon gives way as a result of disease in the surrounding bone, but in the traumatic cases the rupture has always been found away from the groove, and most usually above, near the origin of the tendon, sometimes at the conjunction of the tendon and muscle belly. Keen reports a case in which the tendon was found intact, but the periosteum and a portion of the margin of the glenoid was torn off. This is, in fact, a case of fracture of the scapula by muscular action. In most cases the site of rupture can only be definitely stated at operation. The proper treatment is operative.

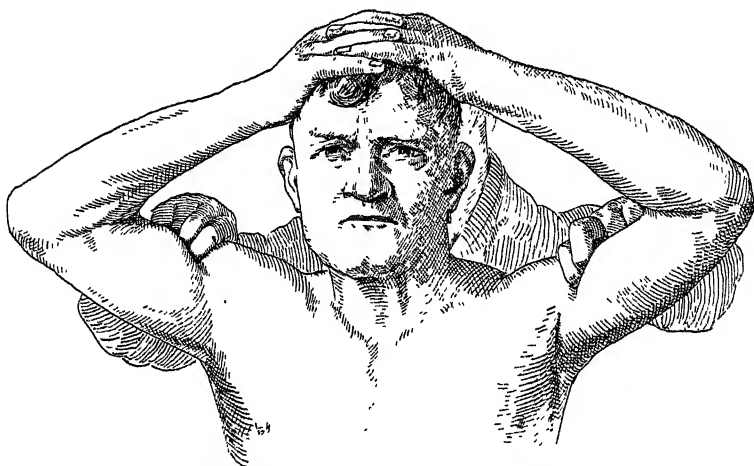


Fig. 81.—Showing position of arms and examiner's fingers in testing for ruptured long head of biceps tendon. (Redrawn from the 'Annals of Surgery'.)

The writer suggests the following diagnostic test: The patient is directed to place his folded hands, palms down, on the top of his head, and allow the locked fingers to support the weight of the arms. In this position there is maximum relaxation of the long head. The examiner then places two fingers on the tendon of the long head of the biceps in each arm (Fig. 81), and directs the patient simultaneously to contract and relax both his biceps muscles. The contraction of the long head tendon on the sound side is plainly felt, while it is absent on the affected side if the tendon is ruptured.

REFERENCES.—¹*Practitioner*, 1923, Jan., 99; ²*Ann. of Surg.* 1923, March, 358.

SPRUE.

Sir Leonard Rogers, M.D., F.R.C.P., F.R.S.

ETIOLOGY.—A. Powell¹ records a number of instances in which several successive cases of sprue developed in the same house or room, suggesting infection, such as 6 cases in the successive families of Bombay police occupying one house, and none among nine other similar houses; and 2, 3, 4, and 4 cases in four of eighteen rooms at a club, and only 2 other isolated cases, the food being particularly good here, which he mentions is against dietetic deficiency

as a cause. Manson-Bahr in the discussion added some similar instances observed by him in Ceylon.

B. K. Ashford² discusses the deficiency of essential food elements as one cause of sprue in Porto Rico, and states that 29 deaths occurred in his first 350 cases, about half of which received one-sided diets, but only 2 of 248 in his 1920 series with liberal balanced diet, less sugar of commerce and cereals, and in one-third of them *Monilia psilosis* vaccines; and he points out that, in the rush to grow sugar during the war, fruits and vegetables became deficient. In a further paper³ Ashford records a clinical investigation of over 1000 cases of sprue, and gives elaborate tables and diagrams of the relative frequency of the different symptoms. He attributes the disease to physiological glandular deficiency due to climatic and dietetic conditions predisposing and paving the way to infection by the *Monilia psilosis* described by him, 84 per cent of recent cases having given a complement-deviation test with this fungus; sore tongue and diarrhoea were both present in 83 per cent.

TREATMENT.—H. H. Scott⁴ was impressed by the similarity of the symptoms of sprue to those occurring as the result of calcium deficiency or disordered calcium regulation by the parathyroid glands, such as tetany, cramps, loss of weight, and oedema; but blood examinations showed a normal coagulative calcium. He therefore treated a case of two years' duration with Calcium, with only temporary improvement; but on adding Parathyroid the results were most striking, as the cramps, soreness of the mouth, acidity, and flatulence rapidly disappeared, and the stools regained their normal colour for the first time for two years, and weight was steadily regained. He attributes the disease to acid dyspepsia induced by excessive proteid or fatty diet and citrates in fruits.

S. M. Lambert⁵ reports his personal experience of sprue contracted after living in close association with a case of the disease for six weeks. A diet of milk and bananas checked the diarrhoea, which returned when not able to follow it, but Hydrochloric Acid Dil. 0.2 per cent in 15 min. doses before meals, and Pancreatin in 10 gr. doses half an hour after, continued for six months, cleared up the trouble.

REFERENCES.—¹*Trans. Roy. Soc. Trop. Med. and Hygiene*, 1922, June, 125; ²*Amer. Jour. Trop. Med.* 1922, March, 139; ³*Amer. Jour. Med. Sci.* 1923, Feb., 157; ⁴*Trans. Roy. Soc. Trop. Med. and Hygiene*, 1923, Feb., 475; ⁵*Jour. Amer. Med. Assoc.* 1923, June 30, 1910.

SQUINT. (See EYE AFFECTIONS, GENERAL.)

STAMMERING.

A. J. M. Wright, M.B., F.R.C.S.

The subject of stammering receives little attention from the profession as a whole. The Chief Medical Officer,¹ Board of Education, has given a very useful study of the subject as affecting school children, which may be summarized as follows:—

Stammering may be regarded as a spasmodic neurosis of co-ordination. Three parts of the mechanism of speech have to be considered: respiration, vocalization, and articulation. Stammerers are shy and nervous. They either stammer because they are shy and nervous, or because they stammer they become shy and nervous. Other factors are an inherited predisposition and imitation; usually these two act together. Sometimes imitation alone is sufficient. Another direct cause which may act with an inherited predisposition is shock, either alone or with injury. Stammering may follow acute infective disease, and there seems to be a distinct association in some cases between stammering and enlarged tonsils and adenoids. Thus, tonsils and adenoids are found in 21 per cent of stammerers, while in normal children the

figure is 10 per cent. The difficulty is, as a rule, least pronounced in the case of the vowels and most noticeable with the explosive consonants. The trouble usually starts in early childhood, increasing in severity between the ages of 11 and 14. Boys are more frequently affected than girls, the proportion being three to one. The severity of the trouble varies from an occasional slight degree of difficulty with explosives to one in which not only all the muscles associated with speech are affected but, in addition, there is an associated contortion of face and neck muscles.

TREATMENT.—From the point of view of treatment, this complaint has to be regarded from the standpoint both of a neuromuscular affection and of a psychic condition, often of great complexity. Some cases require individual attention, but a large number will respond to treatment in classes. The treatment must be directed to the physical condition of the child, its general mental condition, and to the defect itself. As far as the physical condition is concerned, any cause of malnutrition or anæmia should receive appropriate treatment. The importance of tonsils and adenoids has already been referred to; in addition, dental defects should receive attention. An open-air school with a generous allowance of games and the avoidance of undue fatigue is helpful. In regard to the general mental condition, it is most important to try to induce confidence in the cure. A lack of concentration and will-power is frequently present in these cases. Direct treatment of the defect is essentially suggestive, and therefore confidence in the teacher is necessary. It consists in respiratory and vocal exercises carried out once or twice daily.

Respiratory Exercises.—Breathing in the stammerer is usually shallow and unco-ordinated. All actions should therefore be measured, full, deliberate, rhythmic, and co-ordinated. Attention should be particularly directed to deep breathing, so that a sufficiently prolonged expiration may be available to execute correctly the speech movement.

Vocal Exercises.—The individual must be taught to speak in a new voice. He ceases to stammer when speaking in a voice of a different pitch from his normal, the well-known fact that stammering ceases during singing being an example of this. The voice of the stammerer is harsh and monotonous, due to cramps of the laryngeal muscles. If a greater degree of flexibility and melodiousness can be introduced into the voice, stammering will cease. Thus, the normal individual pronouncing the word 'papa' will vary the pitch on the two syllables, while the stammerer will not. This variation in pitch or flexibility can be taught by the use of vocal exercises which avoid the stammering voice and pass gradually from simple combinations of vowels and consonants to sentences and eventually to connected speech. Berguend's exercises, on which most systems are based, consist essentially in, at first, the singing of long vowel sounds on expiration only. This is followed by varying sequences of vowels, with variations in pitch and rate. Later, sentences are added, and then counting with the singing voice. Reading, recitation, and conversation are gradually introduced. At first, all exercises are carried out on expiration only, with a definite pause for inspiration. As confidence is obtained, the sing-song character of the voice is gradually dropped. Ten to fifteen is the ideal number for a class. The course of treatment should last for at least six weeks, the special exercises occupying two hours twice daily, mixed up with ordinary class work. It may be better to forbid the ordinary speech during the first fortnight of treatment. In early cases, the mere insistence on slow speech on expiration may suffice to prevent the development of the affection. Ridicule should be carefully avoided.

Results.—Most cases, at the end of six or eight weeks, can read or converse well. Some cases relapse, and the proportion may be as high as 50 per cent

in the absence of continuation treatment. It is therefore advisable to give refresher courses at intervals, and the co-operation of the parents is essential.

Leary,² dealing with the *psychic side of stammering*, emphasizes the fact that the condition is a pure neurosis. Repressed fear, a usual factor in the shell-shock stammerer, may also exist with some children. This possibility should be considered, particularly in reference to the home surroundings, in which either irritability or misplaced sympathy is harmful. In such cases a change of environment is helpful, and an effort should always be made to effect a cure before school life, so as to avoid teasing or mimicry. Scripture³ also emphasizes the importance of dealing with any suppressed fear. He has found psycho-analysis sometimes helpful in dealing with this factor. Clark⁴ considers that most children who stammer do so as a result of inadequate early training in normal speech expression. He considers that there is a basic fault in the character formation of the individual, which fault produces the stammer, and consists in the main of a shyness and timidity towards all forms of self-expression.

REFERENCES.—¹*Annual Report of Board of Education*, 1913; ²*Med. Jour. of Australia*, 1923, Feb. 10, 141; ³*Lancet* 1923, i, 749; ⁴*Med. Record*, 1922, April 15, 609.

STOMACH, SURGERY OF.

E. Wylllys Andrews, M.D., F.A.C.S.

F. L. Apperly¹ discusses the *mechanism of hyperchlorhydria*. His observation in an Australian clinic leads him to the conclusion that increased acid is due to increased gastric secretion, but is lowered by the alkaline regurgitation from the duodenum. The opening and closing of the pylorus is a matter of tension on the two sides of the pylorus and of some sensory mechanism in the duodenum rather than of Cannon's law. Actual pancreatic disease or obstruction of the channels by which the juice normally enters the stomach may cause hyperchlorhydria. He is also testing a 0.4 per cent hydrochloric acid solution as a chemical test for pancreatic juice.

F. A. Graham,² in a comprehensive review of *gastric syphilis*, says that this is now more frequently recognized, owing to the greater use of the Wassermann test and gastric X-ray examination. Marked deformities of the stomach without corresponding cachexia or signs of ulcer or cancer suggest lues. He has found no case in which the spirochaetes were demonstrated. Following the ideas of Mills and Eustermann, he finds the complications similar to those of scar-formation from peptic ulcer—namely, hour-glass contraction, perigastric adhesions, and even perforation and hæmorrhage. Of the 32 recorded cases of gastric syphilis, gastro-enterostomy was done in 17, resection of the pylorus in 4. The cases were not markedly benefited, and there were two deaths. Graham reports three cases of his own in which there was moderate thickening of the entire stomach and narrowing of the pylorus; two cases had positive Wassermann. He is doubtful of the value of operation where there is organic stenosis or hour-glass formation with thickening of the whole stomach.

E. Perman³ publishes investigations on the *histology of gastric ulcer* as met in the Scandinavian clinics. He contradicts the histology of gastric ulcer advanced by Rokitsansky and Hauser, that the healing of the ulcer is due to shrinkage of the surrounding tissue. He thinks the healing process of the granulation layers is of greatest importance. His pathological material consisted of resected ulcers from living patients, and he claims that autopsy material is valueless. The innermost layer is a zone filled chiefly with cell nuclei, transformed fibrin, gastric epithelium, and gastric contents. The granulation layer consists of loose granulations with young fibroblasts and newly-formed capillaries, running straight towards the ulcer.

G. W. Crile⁴ has collated the *end-results in 560 cases of stomach surgery* at

the Cleveland Clinic. Of these, 189 were carcinoma of the stomach and 5 of the duodenum; 2 were sarcoma of the stomach; 159 ulcer of the stomach; 200 ulcer of the duodenum; and 5 unclassified tumours of the stomach. While his early mortality was high, his late series of 108 gastro-enterostomies with resection showed 2.8 per cent, and simple gastro-enterostomy less than 1 per cent. Of the 560 cases, 450 were treated by operation. A questionnaire sent one year ago showed 82 per cent had their symptoms relieved, 85 per cent were able to resume normal work, 65 per cent had required no further treatment, 22 per cent received some post-operative treatment. Thirty-one had gained in weight, and in 7 there was loss of weight.

E. R. Schmidt⁵ reports 44 cases of *perforation of gastric and duodenal ulcer*. He states that the average mortality has been between 10 and 40 per cent. In no case was operation refused because of the patient's poor condition. Most of his patients were between 20 and 40 years of age. Only two were under 21, and fourteen were over 40 years. Five of the patients gave no ulcer history. The mortality in cases operated under twelve hours was 13 per cent, and after twelve hours 57 per cent. In the duodenal perforations there was no death in 10 cases. He does not favour gastro-enterostomy but rather temporary gastrostomy as an accessory operation.

F. N. G. Starr⁶ discusses the surgical aspect of *cancer of the stomach* in his Canadian clinic. He emphasizes the fact that pain is often only a late symptom, and the need of early and thorough examination at the time the patient complains of discomfort. In his first 8 cases before 1911 he was only able to perform palliative operations. The next series of 29 cases showed 45 per cent palliative gastro-enterostomies, and in the remainder resection of the stomach was done; of these, 2 are still living, and the remainder cannot be traced. His next series included 39 cases of gastric cancer; 12 of these had palliative operations and 13 a radical operation; of these, 4 died and 8 are living. The author advises the use of local anaesthesia in operating on these late cases.

Moynihan⁷ presents an interesting discussion of *problems in gastric and duodenal ulcer*, as seen in his experiences of the past ten years. In ulcer the outstanding symptom is periodic epigastric pain. In 718 cases, 531 were duodenal ulcer, mostly men; 164 gastric ulcer, about equally divided between the sexes; 23 cases had both duodenal and gastric ulcer. This master surgeon has operated on more than 500 duodenal ulcers since 1912 without a death. Only 6 of these were complicated by jejunal ulcer. The diagnosis of duodenal ulcer can be made from the history, while the diagnosis of gastric ulcer is more difficult and the X-ray examination of greater aid. Moynihan advocates the duodenal tube in patients whose ulcers cannot be removed, thus relieving the diseased ulcer area of all irritation. In the Leeds Infirmary, 1910-21, 75 patients with gastric ulcer died from hæmorrhage or perforation, and 129 from perforation or hæmorrhage of a duodenal ulcer. In common with many modern surgeons, Moynihan declares the result of modern surgery not good enough. He favours excision, especially Balfour's cautery method, and unlike many continental surgeons he uses an anterior placement for his gastro-enterostomies.

J. Palugyay⁸ has investigated roentgenologically the functional behaviour of the stomach following the different types of posterior retrocolic gastro-enterostomy on the material of the Hochenegg clinic. On the basis of 61 cases he comes to the following conclusions: In the selection of the type and position of the anastomosis the surgeon must consider whether the stomach is of normal size or dilated, and whether it has a hook or cattle-horn shape. In the dilated stomach, he must consider to what extent the gastric wall will permit regression of the dilatation, and whether adhesions are present at the pyloric portion which, when the stomach is reduced in size, may produce a change of form

from a hook shape to a cattle-horn shape. The first two points are determined by the X-ray examination and the latter at operation.

H. Finsterer⁶ in several recent articles has taken a foremost position as an advocate of *radical stomach resection for benign ulcers* of the stomach, pylorus, and duodenum. He also has proclaimed the value of Braun's splanchnic anaesthesia as an aid to reduced mortality. In reporting 175 patients he claims to show that advanced age is no obstacle, as 33 per cent in this series were over 60 years old. In carcinoma cases his mortality was 17 per cent. In benign cases, chiefly, of course, ulcer, he performed 369 resections of the stomach, of which 12 were from 60 to 82 years old. In these 12 cases there was only one death. The general result of Finsterer's successful work, which began in Hochenegg's Clinic and is now quite widely used, is to strengthen the position of those who advise resecting the lesser curvature or acid-bearing area of the stomach, inasmuch as many operators are getting as low a mortality as was formerly obtained from gastro enterostomy, and a much larger percentage of permanent cures.

REFERENCES.—¹*Med. Jour. Australia*, 1923, Jan. 13, 33; ²*Ann. of Surg.* 1922, Oct., 449; ³*Acta Chir. Scand.* 1922, lv, 286; ⁴*Ann. of Surg.* 1922, Oct., 467; ⁵*Acta Chir. Scand.* 1922, lv, 313; ⁶*Canad. Med. Assoc. Jour.* 1923, xiii, 24; ⁷*Brit. Med. Jour.* 1923, i, 221; ⁸*Deut. Zeits. f. Chir.* 1922, clxxiii, 197; ⁹*Wien. med. Woch.* 1922, lxxii, 1641.

STREPTOCOCCUS INFECTIONS.

J. D. Rolleston, M.D.

SYMPTOMS AND COMPLICATIONS.—A milk-borne epidemic of *septic sore throat* which occurred at Portland, Oregon, is described by R. L. Benson and H. J. Sears.¹ There were 487 cases, with 22 deaths, or a mortality of $4\frac{1}{2}$ per cent, almost exclusively among the customers of a single raw-milk dairy. The probable source of the epidemic was a cow with a consolidation of the left front quarter of the udder, the milk from which on standing settled out differently from that of the other quarters. The lower half of the milk column consisted of yellowish-creamy pus containing numerous pus-cells and many streptococci. Ten million hæmolytic streptococci per c.c. were found on cultivation in the milk from this quarter, a few in the left rear quarter, and none in the other two quarters. Similar strains of hæmolytic streptococci were grown from a milker's throat and from the throats of numerous septic-sore-throat patients and contacts. The milker in question probably infected the cow's udder, producing purulent mastitis, and the epidemic arose from the cow being milked in with the herd on one or more occasions. Of the 487 cases, 166 had either serious complications or showed prolonged sepsis. Three of the fatal cases were in patients already ill in hospital at the beginning of the epidemic, and several other deaths were in senile individuals. The chief complications, in order of frequency, were erysipelas, otitis media, arthritis, peritonitis, skin eruptions, myocarditis, sinus infection, appendicitis, encephalitis, nephritis, and endocarditis.

L. B. Greene² reports a case of *acute streptococcus penile gangrene* in a robust young man, age 19. The disease commenced as a small red area on the dorsum of the penis, and eighteen hours later there was general redness, enormous swelling, and pain throughout the entire shaft of the penis, which became dusky red and cedematous with a black area on the middle of the dorsal aspect. There was no evidence of urethritis or venereal disease. The temperature was 104°, the pulse 120, and there was marked prostration. The leucocytes numbered 14,850. Cultures made through the seared skin gave a pure growth of streptococci in long and short chains. A line of demarcation formed on the fourth day, and all the skin intervening between it and the mucous membrane, being distinctly gangrenous, was removed without an anæsthetic. Recovery took place with considerable scarring and distortion of the organ.

PROPHYLAXIS.—A. L. Bloomfield and A. R. Felty³ found that the carriage of beta-hæmolytic streptococci in the tonsils seemed to prevent attacks of tonsillitis, as only one case, or 2·5 per cent, occurred among 49 carriers, as compared with 28, or 56 per cent, among 50 non-carriers. They therefore carried out a series of prophylactic vaccinations with strains of beta-hæmolytic streptococci. Of 90 volunteers: 33 were carriers, of whom 17 were vaccinated and 16 served as controls, and 57 were non-carriers, 18 of whom were vaccinated. No case of tonsillitis occurred among the carriers, whether vaccinated or not, whereas 15 of the non-carriers—12 among the non-vaccinated and 3 among the vaccinated—developed the disease. All but one of the cases among the non-vaccinated were severe, while the 3 cases among the vaccinated were extremely mild.

REFERENCES.—¹*Jour. Amer. Med. Assoc.* 1923, i, 1608; ²*U.S. Med. Bull.* 1923, 243; ³*Johns Hop. Hosp. Bull.* 1923, 251.

SURGERY, FOOTPRINTS OF.

Sir W. I. de C. Wheeler, F.R.C.S.I.

Periods of intellectual activity in the world's history mark a simultaneous move forward of all branches of science and art, and then follow epochs of intellectual torpor marked by an absence of ambition and a state of stagnation. When the Pharaohs were building the Pyramids, Egyptian surgeons were treating fractures with success. When Barrie was designing the Houses of Parliament, the open-air treatment of consumption was advocated and, later, Lister was revolutionizing surgery. The discovery of anæsthetics in Scotland was not far removed from the time that Sir John Fowler and Sir Benjamin Baker, after a period of seven years and with the help of four thousand men, completed the building of the Forth Bridge.

Probably the earliest efforts of intelligent beings were directed towards the prevention and cure of disease; Mesopotamian medicine is known to have been well defined as far back as 2200 B.C., and the first physician mentioned in history—Sekhet'enanch—dates about 1000 years earlier.

Abraham Colles was President of the College of Surgeons in Ireland in 1802, and the great William Stokes, of stethoscope fame, was born a few years later. There was a plethora of great medical minds at this time throughout the world. Ireland held a high and honoured place, supported by such champions as Colles, Graves, Stokes, and Corrigan, and, later, by Butcher and Tufnell.

Times have changed, and a new era has dawned. In a general sense William Mayo, one of the greatest of men, spoke truly when he said that in his father's time success in the profession was more or less dependent on convention, tradition, and impressive surroundings. The top hat and the double-breasted frock coat of the doctor, the wig and gown of the jurist, and the clerical garb of the ecclesiastic, supplied the necessary stage scenery. The physician in the top hat and double-breasted coat who practised in all branches of medicine and surgery has finally disappeared, and this is one of the visible results of the public's recognition of sound scientific training.

In the transition from individualism to co-operative work, there is much to demolish and much to construct. We still find the profession, on the surgical side, leaning towards that conservatism which would perpetuate competitive medicine and foster self-sufficiency and content. On the medical side, the belief in drugs still holds too much sway. The clamour of the public for prescriptions written in cypher is unabated. The sign of Jupiter heading the prescription is a form of stagecraft which, when coupled with other hieroglyphics, suggests modern competition with the mysticism of mediæval medicine.

The milestones along the road of progress are seen in many forms. Nevertheless, what immense progress has been made! A paragraph written by Sir

Astley Cooper in 1828, in giving directions for reducing a dorsal dislocation of the hip, reads thus: "Free venesection is at first resorted to; then the patient is placed in a bath at a temperature of 100°, the heat of the water being gradually increased until the patient faints. While he is in the water he is given a grain of tartarized antimony every ten minutes until nausea is excited. He is then taken out of the bath, put on a hard mattress, and the bone put back in its socket".

Enthusiasm moves the surgical world. To some minds a mere move forward is synonymous with revolution and breeds hostility; but let us recognize the basic truth that, to those who explore new ground, fertile or otherwise, surgery, like every other science and art, is deeply indebted. Robert Louis Stevenson once said that "to hold the same views at forty as we held at twenty is to have been stupefied for a score of years, and take rank, not as a prophet, but as an intractable brat well birched and none the wiser".

The results of the conservative surgery of bones in the Great War—under the influence of Sir Robert Jones—demonstrated that, with the Thomas splint and the Balkan frame, simple or modified, results could be produced second in place to no others. The use of metal bands, screws, and plates indicates a landmark in the treatment of fractures, but the very simplicity of the method and the anatomical perfection of the primary results have proved a danger. Thousands of cases of fractured femur treated by conservative methods passed through the base hospitals during the War, with not more than a few inches shortening on the total tot. Sir Robert Jones's teaching did that.

We are moving on, and it is the late results of operation that require review. Often in a case of fracture it will be found that the limb involved is unable to resume full duty owing to yielding and insufficient bony consolidation after operative treatment. It must be conceded that the conservative treatment of fractures requires more skill and attention than treatment by operation, and I am inclined to believe that to some extent it is want of skill and want of equipment which have driven many into the operative field. At one time, plates were being removed by some surgeons almost as fast as they were put in by others. Frankly, I dislike the armour-plated surgery of bones. To my mind, like Saul's armour upon David, it has not been proved. I believe that the plating of fractures as a routine is in the nature of a gamble, and that the game of 'put and take' is not to be recommended as a pastime for those engaged in the craft of surgery.

Apart from the perfecting of asepsis and the development of anæsthetics during the past fifty years, there has been no epoch-making discovery. The greatest advance in the surgical field has been team work, and the world is waiting breathlessly for the team which will discover the cause and cure of cancer.

On the road of progress are seen many other footprints. We can see in our path the imprint of those who taught the value and dangers of transfusion of blood, of those who showed us the wonderful properties of radium and the indications and contra-indications for its use, and of those who have aided in bringing obscure abdominal lesions into the daylight by means of X-ray photography. Last, but not least, are seen the steps of those who taught—like Sir John Bland-Sutton—that, before all things, we should remember that "fellow-craftsmen ought not to be competitors, but comrades of the same honoured craft and guild".

The spade work of the last quarter of a century may well prove a preparation for some future advance. The ground is almost cleared for some far-reaching discovery, outshining Listerism itself, terminating in, the physical betterment of the race, and contributing to the restful happiness of mankind.

SYMPATHECTOMY. (*See* ARTERIAL DECORTICATION.)

SYNOVITIS, ACUTE. (*See* BONE AND JOINT SURGERY.)

SYPHILIS. (*See also* ENCEPHALITIS HÆMORRHAGICA; LUNG, SYPHILIS OF; NEUROSYPHILIS, TABES, AND PARALYTIC DEMENTIA.)

Col. L. W. Harrison, D.S.O.

DIAGNOSIS.

Serum Tests.—The Medical Research Council's Special Report, No. 78, is devoted to a comparison between the Sigma flocculation test of Dreyer and Ward and the Wassermann test. The report deals in complete detail with the comparisons carried out by three different sets of workers. It also contains practical descriptions of the tests which were compared, and is altogether a valuable work of reference on this important subject. It is possible here to give only the main conclusions of the different sets of workers. The first part, by Dreyer, Ward, McIntosh, and Fildes, is based on comparative tests of 894 specimens of serum from 571 individuals. The Sigma tests were carried out in the Oxford University Laboratory, and the Wassermann in the laboratories of McIntosh and Fildes. The authors conclude that: (1) An approximately equal number of positive results is obtained by the Wassermann and Sigma tests in untreated cases of manifest syphilis. (2) The Sigma test gives a larger number of positive reactions in treated cases, especially those which give small sigma readings. (3) When the two reactions are expressed quantitatively they do not sometimes run parallel, although there is usually a rough correlation between both strong and weak reactions with each test. (4) In supposed non-syphilitics, one or other of the reactions was positive on 7 occasions. In 4 of these, both reactions were positive; in 3 the Sigma was positive and the Wassermann negative; and in 1 the Wassermann was positive and the Sigma negative.

The second part of the report is by Houston, Campbell, and Smyth, the tests having been carried out in the Pathological Laboratory of the Royal Victoria Hospital, Belfast. The tests compared were No. 1 method (M.R.C.) Wassermann, Fleming's modification of the Wassermann test, and the Sigma. Altogether 1342 specimens were examined, and most of the results were in complete, or almost complete, agreement. In a certain number of cases the Sigma reaction was positive while the Wassermann was negative; these were mainly in cases which gave low Sigma readings, though sufficiently high to warrant a diagnosis of syphilis. In some other cases the reverse occurred, suggesting that the reacting substances to the two different orders of test are different. Generally a regular fall in the Sigma readings occurred under treatment, and the reaction persisted longer in treated cases than did the Wassermann. The authors consider the Sigma test more valuable than the Wassermann, but rightly insist on meticulous care in technique.

The third part, by Stokes and Wigham, describes a comparison between No. 1 method (M.R.C.) of the Wassermann test and the Sigma. The authors conclude that the chief advantage of the Sigma test are: (1) That only two reagents are employed instead of five; (2) The large amount of information it affords; (3) That, owing to standardization of the technique, results of different workers are comparable; (4) That it is simple and inexpensive; (5) By its routine employment it will probably be possible to make treatment less empirical and more in accordance with the requirement of individual cases. They mention two disadvantages: (1) It is more laborious for large numbers of cases; (2) More serum is necessary.

The results obtained by the workers who have taken part in this comparison agree generally with those by Dr. E. J. Wyler in an international comparison of the Wassermann test, Sachs-Georgi, and Sigma tests undertaken for the League of Nations, in which the reviewer is interested. As to the reliability of the Sigma test there can be no doubt. As to expense, if this is considered merely from the point of view of materials, the Sigma test undoubtedly has the advantage. But if man-power is reckoned—and it is an important item of expense—it does not seem to the reviewer possible to make the Sigma test as inexpensive as it is possible to make the Wassermann, if the directions of its authors are followed strictly.

Kahn's flocculation test has been tried by a number of workers, who find generally a close parallelism between the results of this and the Wassermann test. Kahn's test is simpler than the original Sachs-Georgi or the Sigma, and the extract contains more cholesterol. Fresh ox-heart freed from fat, fibre, and vessels is minced and thoroughly dried with a fan. It is then extracted with ether to remove fat, the ether being renewed daily for three days and then filtered off. The residue is dried again until free from ether, and is then extracted with five times its amount of 96 per cent alcohol for nine days in the ice-chest and one day at room temperature before being filtered. To the filtrate is added cholesterol in the proportion of 0.4 per cent. Kahn has recently modified his test in certain important particulars in order to increase its delicacy and to overcome the necessity of incubation over night. He claims that the reaction is now complete in 95 per cent of positive cases in from five to ten minutes, and in the others in about an hour. The strength of antigen to be used in the test is the lowest dilution in which the precipitate can be dissolved with a little 0.85 per cent salt solution. A series of dilutions of antigen is prepared by adding to 0.5 c.c. antigen in each of a number of tubes 0.3 c.c. saline, 0.4 c.c., 0.5 c.c., and 0.6 c.c. From each of these dilutions, in which there is a precipitate, a sample of 0.1 c.c. is taken and added to 0.2 or 0.3 c.c. saline in a separate tube. The smallest dilution of which the sample thus treated goes into complete solution is chosen for the test; usually it is a mixture of equal parts antigen and saline. The antigen for a series of tests is diluted by adding the salt solution suddenly, and pouring from one tube to another several times. It should be prepared not more than half an hour before the tests. The actual amounts of serum and diluted antigen used in the test do not matter so long as the proportion of serum to antigen is correct. Assuming that 0.15 c.c. serum is to be used, into three tubes are pipetted respectively 0.05 c.c., 0.025 c.c., and 0.125 c.c. diluted antigen, in such a way that the pipette touches the bottom of the tube whilst the antigen is being delivered. In each tube is then placed 0.15 c.c. serum which has previously been heated at 56° C. for twenty minutes. The rack of tubes is vigorously shaken for three minutes, by the end of which time the strongly-acting sera have produced visible precipitates. The results are read in front of a window against a dark background and with the tube held almost horizontally above the eye level. A precipitate in a clear medium is a four plus reaction. If the medium is not quite clear, the reaction is three plus; if the medium is cloudy, the reaction is two plus; and a weak precipitate in a cloudy medium is a one plus. At the end of one hour's incubation the strongly-reacting tubes are picked out and the remainder shaken for one minute before the final reading. To see clumps in the strongly-acting specimens it is necessary to prolong the incubation for three hours. It will be seen that the test is extremely simple, and can be carried out rapidly and easily by anyone able to use a pipette accurately.

PREVENTION OF CONGENITAL SYPHILIS.

Boas and Gammeltoft⁴ found that 7.7 per cent of parturients in the Riggs Hospital, Copenhagen, in 1921, were syphilitic as judged by serological and clinical tests. The authors have traced the result of maternal syphilis to the infant, and have related this to the amount and kind of treatment which the mother had received. Thanks to the admirable Jersild system of nameless notification which exists in Denmark, Boas and Gammeltoft have been able to follow up their cases so closely that their observations are particularly valuable. The results of their investigation can most conveniently be shown in the following table:—

Treatment of Mother	Cases	Syphilis in Infant	Healthy	Period of Observation of Healthy Children
1. Untreated	158	157	1	8 years
2. Mercury before, none during pregnancy	87	78	9	6 months to 15 years
3. Salvarsan before, no treatment during pregnancy ..	15	12	3	
4. Mercury during pregnancy	111	80	31	6 months to 8 years
5. Salvarsan during pregnancy	79	19	60	6 months to 6 years
6. Salvarsan before, mercury during pregnancy	26	7	19	6 months to 3 years
7. Salvarsan before and during pregnancy	7	1	6	1 to 5 years

The authors consider, as a result of their investigation, that the age of the infection does not affect the question of treatment during pregnancy; nor does the fact of a continuously negative Wassermann reaction; and they cite examples in support of their contention. They quote Boeck's case in which a woman infected during infancy gave birth to a syphilitic infant thirty-seven years later. As an example of many cases of their own, they cite the following: First pregnancy: no treatment: infant syphilitic. Second pregnancy: treated: infant healthy. Third pregnancy: after no treatment for eighteen months, infant syphilitic. Fourth pregnancy: treated: infant healthy. They find that, if the mother is negative at the end of pregnancy, the infant is less likely to be syphilitic. Thus, out of 274 infants born of mothers positive at end of pregnancy, 267 were syphilitic, while out of 104 born of mothers who were negative but syphilitic, 24 were syphilitic.

A. Couvelaire gives the following statistics from the Baudelocque Clinic. Out of 37 cases of syphilis contracted during pregnancy, only 22 per cent resulted in living infants, and at the end of a year it was found that all these had died. Out of the cases in which syphilis was contracted shortly before conception, 36 per cent resulted in living infants, and by the end of a year only one could be traced as living. Out of 41 cases of long-standing syphilis there were 73 per cent of living infants. The effect of treatment was shown in the following: Amongst those infected during pregnancy and submitted to treatment there were 34 per cent of still-births. Amongst those infected shortly before and treated only during pregnancy there were 8 per cent of still-births, but none amongst those treated before and during pregnancy or amongst the long-standing cases which were well treated. Infants which survived for twelve months were also far more numerous in the well-treated cases. The treatment was exclusively with injections of Sulfarsenol.

VISCERAL SYPHILIS.

Uterine syphilis is discussed by Sosnowski, who has collected 87 cases. With the onset of the secondary stage, leucorrhœa, pain in the back, heaviness in the pelvis, menorrhagia, and metrorrhagia are often overlooked because of the other symptoms. Succeeding the secondary stage is one of hyperplasia, with enlargement of the uterus, which is often boggy, and symptoms of pelvic congestion—menorrhagia, backache, constipation, and sometimes even morning sickness resembling that of pregnancy. Often the uterus is retroflexed, adding the troubles consequent on its malposition to the others. The author points out that at a later age of infection tertiary lesions may be mistaken for carcinoma, and recommends as a routine measure that in all cases of uterine disease the question of syphilis should be considered.

U. J. Wile discusses the changes which occur in *hepatic* and in *cardiac syphilis*, and concludes that the best treatment is the slower one with *Mercury* and *Iodides*. From the point of view of prognosis he divides syphilis of the liver into three types: (1) Cirrhosis with predominance of gummatous tumours; (2) Combined gummatous with extensive interstitial hepatitis; and (3) Purely interstitial hepatitis. In the first class excellent end-results may be obtained from *Arsenobenzol* treatment; but in the other two, though the improvement may be good at first, the patient's liver may become so hopelessly embarrassed by cirrhosis that the end-result is bad. Wile considers that a treatment which acts slowly does not allow connective tissue to form at a greater rate than recovery of liver-cells, and the result is a liver which functions better. He employs a similar argument in the case of late syphilitic disease of the heart wall. The syphilitic infiltrates, while they undoubtedly weaken the heart wall, have a certain degree of elasticity. Their rapid displacement, or disintegration, may lead to actual gape and to such a rapid fibrosis that many otherwise normal heart-muscle cells are snared off, resulting in further embarrassment, most often manifested by acute dilatation. The author cites cases to support his argument.

W. K. Hunter relates two cases of gumma of the liver with symptoms of abscess formation. In the first the liver was punctured, with negative results. A blood-test gave a positive Wassermann reaction, and within three days of commencing antisyphilitic treatment the fever, which had existed for about five weeks, disappeared. In the second case the result of a blood-test led to postponement of the exploratory puncture and institution of antisyphilitic treatment, under which the patient made a slow but good recovery. In a third case the symptoms indicated gall-stones, but the attacks of pain were on the left rather than the right side. The patient recovered under increasing doses of *Potassium Iodide*.

J. H. Stokes and P. W. Brown give an analysis of 200 cases of syphilis, in 35 of which abdominal operations had been performed without relief. The cases are divided into 11 with gastric crises, 16 with other types of neurosyphilis, 3 with gastric syphilis in which there was a question of malignant disease; 3 similar cases of hepatic syphilis and 2 cases of latent syphilis in which the symptoms were relieved by antisyphilitic treatment. The authors show that a routine blood-test should be carried out in all cases of visceral disease or complaint indicating such, and that, if negative, the examination should be extended to the spinal fluid.

TREATMENT WITH BISMUTH PREPARATIONS.

Balzer's conjecture in 1889 that bismuth salts would prove useful in the treatment of syphilis was shelved at first by the severe toxic effects of the preparation employed, the ammonio-citrate, when injected into dogs. It

was revived in 1916 by Sauton and Robert, who showed that the tartro-bismuthate of potassium and sodium is preventive and curative of fowl spirillosis, as well as trypanosomiasis. Sauton and Robert expected, on these grounds, that bismuth would be valuable in the treatment of syphilis and recurrent fever. Their hypothesis was shown to be well founded for animal syphilis by Sazerac and Levaditi in 1920. The experimental work of Sazerac and Levaditi was confirmed for human syphilis by Fournier and Guénot in over 200 cases. The conclusions of these pioneers have been supported with singular unanimity by syphilologists in all countries, and it can be said with confidence that bismuth is entitled to a high place amongst antisyphilitic remedies. Generally the reports show that, in the doses which can be administered intramuscularly with safety, bismuth preparations have a greater and more rapid therapeutic effect than mercurial, though they may not be so quickly acting as the arsenobenzol. In this connection the opinion of Milian may be mentioned, that the main antisyphilitic remedies compare in therapeutic efficacy as follows: arsenobenzol 10, bismuth 7, and mercury 4. Whilst willing to agree with Milian's comparison when the immediate effect is considered, Felke believes that a course of bismuth injections is, in the long run, as effective as one of arsenobenzol in conjunction with mercury, the slower action of bismuth being compensated for by its greater persistence. It is interesting, in view of the eventual success which has attended the treatment of syphilis with bismuth, that Ehrlich and Karrer overlooked its spirocidal properties in experimenting with an arsenobenzol combination with the metal, while Giemsa quotes Kolle and Ritz as having witnessed no effect on spirochaetes or symptoms from the injection of colloidal bismuth hydroxide.

It will be possible to give here only a very condensed summary of the voluminous literature which has already accumulated on the bismuth treatment of syphilis; but the established value of bismuth justifies an account of this new remedy which must be somewhat lengthy to be of practical value.

The list of preparations of bismuth on the opposite page may be useful for reference, though it is inevitable that it will be out of date by the time it can appear in print, and will become rapidly more so as the year advances. The various preparations are usually put up in ampoules.

Method of Administration.—Experiments on animals by Sazerac and Levaditi, Didry, and others have shown that bismuth preparations are from ten to twenty times as toxic when given intravenously as when the intramuscular route is chosen. Inunctions have given indifferent results. Rectal administration was employed by Sazerac and Levaditi in their animal experiments, and was reported to give good results; but this method does not appear from the literature available to have been employed in the treatment of human syphilis. A few workers, such as Lacapère and Galliot, have administered colloidal bismuth intravenously; but the very great majority prefer the intramuscular route, because of the greater toxicity of bismuth when injected intravenously.

Choice of Preparation.—As in the case of mercury, the ultimate effect of bismuth depends on the amount of the metal administered, and the form in which it is injected seems not to be of very great importance, though preparations which are absorbed more quickly than others probably have a more rapid effect. It seems likely, on these grounds, that the choice of preparation will fall on that which causes the least pain. On this point opinion is fairly unanimous: that the solutions are more painful than the suspensions, and it may be added that some suspensions are certainly far more tolerable than mercurial cream or grey oil, giving rise to little or no discomfort. In the writer's experience, the oxychloride, precipitated bismuth, and the hydroxide have caused the least discomfort.

LIST OF BISMUTH PREPARATIONS.

Chemical Compound	Medium	Trade Names	Content in Bismuth per cent of the Dried Compound
Tartro-bismuthate of sodium and potassium (T.B.S.P.)	Oil	Trépol	64
	Oil	Luatol	32
	Water or oil	Tarbisol	57
	Soluble powder	Bi 36	26
	Sulphur water	Sigmuth	25
Precipitated bismuth	Oil	Neo-trépol	96
	Creo-camphor base	Bismuth grey oil	
	Water	Bismuthyl	97
Bismuth hydroxide	Oil	Muthanol	64
	Oil	Curalues	86
	Water	Spirillan	86
Iodo-bismuthate of quinine	Oil	Quinby	24
	Oil	Rubyl	19
	Oil	Vijochin	20
Bismuth oxychloride	Camphor water	Bisclorol Bioxyl	80
Iodo-bismuthate of quinine and bismuth oxychloride	Oil	Bi-quinil	50
Iodo-bismuthate of vanadium	Oil	Néoby	20
Ethylene diacmino bismuth gallate	Water	Galismuth	1 c.c. = 0.3 Bi
Colloidal bismuth	Colloid	Bismuthoidal	
Basic salicylate of bismuth		Bismogenol	
Trichlorbutyl-malonate of bismuth	—	Milanol	
Bismutho tartrate of potassium	Oil	Nadisan	
Sodium-bismuth derivative of trioxybenzoic acid	Powder	Benzo Bi	20
Oleate of bismuth	Oil	Oleoby	20
Subgallate of bismuth	Oil	Dermatol	50
Amalgam of Bi and Hg	Oil	Disermol	75

Absorption, Excretion, and Distribution in the Tissues.—Sazerac and Levaditi showed that, when injected intramuscularly, even in alkaline solution, bismuth is precipitated. Müller, Blass, and Kratzeisen, working with Nadisan, found in rats, rabbits, and children (the latter having died of influenzal pneumonia during bismuth treatment) that bismuth had been precipitated amongst the muscle fibres, which showed slight signs of necrosis with surrounding granulation cells, but none of these changes were severe. In the Kalle laboratory bismuth was found in the muscle as long as 11 weeks after injection, and Wolfers found it 34 days later. The workers in the Kalle laboratory found, in an infant

who had died of congenital syphilis after five injections of 0·005 grm. nadsan, the following amounts of bismuth per 100 grm. weight: kidneys, 0·005 grm.; brain, 0·0015 grm.; liver, 0·0008 grm.; and traces in the cerebrospinal fluid, but none in the spleen or bones. Besides these, other workers have found the metal in the salivary glands and the digestive track. Excretion commences fairly soon, bismuth being found in the urine from 18 to 24 hours after the first injection. Retention of bismuth in the body is shown by the fact that it has been found in the urine as long as 20 to 25 days after the injection of 2·5 grm. T.B.S.P. Müller, Blass, and Kratzeisen report that in the milk of a lying-in woman after ten injections of nadsan there was found 0·0025 grm. bismuth per 100 grm. The same authors found in 22 cases that the average rate of excretion in the urine was about 2 mgrm. per litre, but in two cases the rate was as high as 10 to 14 mgrm. per litre. Bismuth was found in the urine of one case up to three months after the last injection of an average course. A considerable proportion is also excreted by the bowel, and it is also found in the bile, saliva, and sweat. The long persistence of bismuth in the excretions, indicating its retention in the body, explains the fact that there is strong evidence of bismuth continuing to exert a therapeutic effect for some time after the termination of a course of injections.

Toxicity.—Sazerac and Levaditi found that a rabbit will tolerate a single intramuscular injection of 50 to 60 mgrm. T.B.S.P. (containing about 50 per cent bismuth) per kilo. [which would be 3·0 to 3·6 grm. for a man of 60 kilo. weight.—L. W. H.] A dose of 100 mgrm. per kilo. caused some loss of flesh without always killing, while 200 per kilo. killed in four days. Intravenous injection of 5 mgrm. per kilo. killed in about seven days. Didry found in dogs that 4 mgrm. bismuth per kilo. in the form of T.B.S.P. (equal to about 8 mgrm. of the salt) given intravenously killed in four days, but the animals survived 3 mgrm. With subcutaneous injections the same results were obtained from ten times the corresponding doses. Hopkins found that 100 mgrm. T.B.S.P. per kilo. was the maximum which a rabbit would tolerate. Klauder found that the dose tolerated by rabbits was 125 mgrm. T.B.S.P. per kilo. Bismuth trioxide in oily suspension was tolerated in a dose of 400 mgrm. per kilo., and potassium tartrobismuthate in a dose of 200 mgrm. The results generally seem to show that the toxicity is largely influenced by the rate at which the metal enters the circulation. This factor also influences the rate of action on the disease, since Klauder found in the case of animal syphilis that the therapeutic dose of T.B.S.P. as tested by disappearance of spirochaetes in twenty-four hours was 50 mgrm. per kilo., while bismuth trioxide in oil, which was tolerated in three times the amount of T.B.S.P., required three times the therapeutic dose of T.B.S.P. to produce the same immediate effect.

The symptoms of acute bismuth poisoning have been studied by many workers, from Pott in 1739, and Kerner in 1829, to the present time. Levaditi summarizes them as symptoms denoting an action on the nervous system, the digestive track (stomatitis, dysenteric diarrhoea), and the kidney. Didry describes particularly the symptoms in dogs poisoned by rapidly fatal doses. These were vomiting, convulsions, and tetanic spasms; then inco-ordination of movement, motor paralysis, relaxation of sphincters, arrest of respiration, and, lastly, stoppage of the heart. In dogs which survived the injection for a few days there was dysenteric diarrhoea, and after death were found hæmorrhagic effusions in the intestines, nutmeg liver, with distended gall-bladder and severe nephritic changes. Similar changes were found by Eggenberger, in 1908, in a child which died six weeks after injection of a fistula with 30 grm. of Beck's (bismuth) paste. Stomatitis occurred only a few times in Didry's animals, probably because death generally supervened before it had time to develop.

In man the most notable toxic effects have been stomatitis, nephritis, and enteritis, after varying amounts of bismuth have been given by successive injections. In view of the effects on the central nervous system noted in animals by Didry and others, it is remarkable that there is little reference in the literature to these effects on patients under treatment with bismuth; but Görl and Voigt report four cases in which, after a certain number of injections of bismogenol had been given, there developed occipital headache, restlessness, severe mental depression, and tingling of the hands. The symptoms commenced after totals of 1.2 to 3.4 grm. of bismogenol had been administered in doses ranging from 0.2 to 0.8 grm. The authors quote Aemmer, who reported similar symptoms in a patient whose tubercular abscesses had been injected with 35 grm. of a 10 per cent emulsion of airoi (bismuth oxyiodogallate), and consider that the symptoms are similar to those of lead encephalopathy. It is clear from the absence of reference to these symptoms in current literature that they do not occur in such a severe degree in any but a very small proportion of cases. At the same time it will be noted that such symptoms as depression of spirits, headache, and loss of sleep occurring in a patient under bismuth treatment might easily be attributed to other causes. The commonest sign of intolerance is a slaty-blue line commencing on the gums before or behind the incisor teeth. This is often accompanied by foul breath. If the remedy is continued, the blue deposit extends to the rest of the gum margins and perhaps to the cheeks, and stomatitis characterized by ulcers covered with false membrane follows. The ulceration is particularly apt to occur at places where the mucous membrane is damaged by abrasion or by dental troubles. It is of the nature of Vincent's angina, and is said to be amenable to arsenobenzol treatment. In severe cases a condition of cancrum oris may supervene. Generally such stomatitis as does occur is mild and easily controlled, and usually it does not develop until an effective amount of the drug has been administered, so that the effect of bismuth on the mouth is not a serious impediment to its employment in the treatment of syphilis. Nephritis is less common than stomatitis if albuminuria is the criterion; but Felke calls attention to the fact, confirmed by the reviewer, that before albuminuria supervenes, renal epithelium appears in the urine, singly and in casts. Felke considers that the fourth or fifth injections are critical in this respect, and, in order to allow the kidney to recover, he introduces an interval of two weeks at this stage before proceeding with the course of treatment. Epitheliuria can be detected by the microscope and by a fine fluorescence of the freshly-passed urine.

Therapeutic Dosage.—The dosage commonly employed in the treatment of human syphilis at present is 0.2 to 0.3 grm. twice weekly, to a total of 2 to 3 grm. in ten to fifteen injections. Simon thinks this dosage too small, and gives 0.3 to 0.4 grm. twice weekly.

Therapeutic Effects.—Under the medium dosage, totalling from 0.4 to 0.6 grm. weekly, spirones disappear from the serum of early lesions after the second or third injection. Sometimes, in the reviewer's experience, they cannot be found after the first injection. The effect on clinical signs is more rapid than that of mercury, approaching the effect of arsenobenzol in this respect. It is important to note that a number of workers have reported cases in which arsenobenzol and mercurial treatment had failed to prevent frequent relapses, but bismuth had produced the desired effect, showing that resistance to arsenobenzol or mercury does not imply resistance to bismuth. The facts that bismuth is neurotropic and has been found in the cerebrospinal fluid of treated cases, both indicating the power of this remedy to penetrate to the central nervous system, would lead one to expect a favourable influence on syphilis of the central nervous system. The results so far have been negative

in the case of general paresis, but good effects have been reported by many authors in all other forms of nerve syphilis, including tabes.

The Effect on the Wassermann Reaction.—Fournier and Guénot report the following results of one course of treatment :—

		PERCENTAGE OF REACTIONS	
		Positive	Doubtful
Primary	Before treatment ..	67	25
	After „ ..	0	37
Secondary	Before treatment ..	72	28
	After „ ..	5	4

Klauder found that the cases of primary and secondary syphilis in which the reaction was strongly positive before treatment usually became negative after 2 to 3 grm. of bismuth had been administered. He has noted the fact, observed by many others, and one which the reader would expect after consideration of the remarks above as to rate of absorption and elimination, that a reaction which is positive at the end of a course may become negative during the interval between courses. In this connection Müller reports on 18 cases of syphilis in various stages and treated with bismuth. Of these, 11 were negative a month after the end of the course; and of the remaining 7, 6 had become negative a month later. Clément Simon has the impression that bismuth has a stronger effect on the Wassermann reaction than other antisyphilitic remedies. He admits that arsenobenzol may convert the reaction to negative more rapidly; but it frequently returns to positive, whereas the case treated with the more slowly-acting bismuth may remain positive for a longer period, but once negative tends to remain so. It is admitted, of course, that cases which have become serologically negative under bismuth treatment may, and often do, relapse to positive if treatment is not continued.

SUMMARY.—It seems clear that we have in bismuth a powerful antisyphilitic remedy which in the hands of numerous workers has proved eminently safe. Its toxic effects are similar to those of mercury, and it is similar also to this remedy in the persistence of its action when injected intramuscularly. It acts more powerfully than mercury, and it can be injected intramuscularly or deep subcutaneously in forms which are decidedly more tolerable than any mercurial preparation. It seems likely that it will oust mercury in all cases where intramuscular injections are practicable. Bismuth does not act so rapidly as the arsenobenzol preparations, but, generally speaking, it does not damage the same kinds of tissue. There seems to be no reason, therefore, why it should not be used in conjunction with the arsenobenzol treatment of syphilis, and it may eventuate that the greater effect of bismuth will enable us to reduce the total dosage of arsenobenzol required for the cure of syphilis, by longer spacing of the intervals between injections. This will enable us to avoid such severe arsenobenzol effects as dermatitis and jaundice. The evidence points strongly to the probability that bismuth will be a powerful aid in the treatment of syphilis of the central nervous system.

TOXIC EFFECTS OF ARSENOBENZOL.

Purpura.—Amongst the toxic effects of arsenobenzol treatment, purpura has attracted comparatively little attention. In the so-called encephalitis hæmorrhagica there are found minute hæmorrhages into the brain substance, with possibly hæmorrhages into the renal tubules and the lung alveoli. Occasionally, also, a patient develops purpuric spots and ecchymoses of the skin and

mucous membranes on the day of an arsenobenzol injection, and in severe cases of dermatitis it is common to see evidence of minute hæmorrhages into the skin during life, and submucous hæmorrhages after death (MEDICAL ANNUAL, 1922, p. 480). In rare cases there is a condition of progressive anæmia with the blood changes and histological appearances of aplastic anæmia—great decrease in the number of red cells without increase in the colour index; leucopenia; progressive enfeeblement; hæmorrhages into skin and mucous membranes; and loss of the red colour of the bone-marrow. It is uncertain if all these conditions have a common origin. The sudden hæmorrhages seen in encephalitis hæmorrhagica and in the purpura which develops on the day of the injection, as well as that seen in severe dermatitis, have been attributed to damage of vascular endothelium by arsenic; but it seems likely that the more progressive changes may be due to selective damage of the blood-forming tissues, notably the bone-marrow, as believed by Moore and Keidel (MEDICAL ANNUAL, 1922, p. 480), and this may be connected with the fact observed by various workers, notably Duhot, Gastou and Flandin, and Tzanck, that certain arsenobenzol compounds have an anticoagulating effect on blood. Fortunately in most cases this effect is transitory, but in susceptible subjects the coagulation time may be delayed from thirty minutes to as long as twenty-four hours. [The lowering of the blood coagulability immediately after an arsenobenzol injection is often observed clinically in the bleeding which takes place from the site of the venepuncture after an injection of '914'. In some cases the application of the pad is insufficient to close the puncture, and the patient is alarmed to find, after putting on his coat, that a stream of blood is flowing down his arm.—L. W. H.]

Anwyl Davies and Mellanby found that the addition of 1-1000 neosalvarsan to blood *in vitro* delayed its coagulation by acting on fibrinogen. Their experiments *in vivo* indicated that generally the effect is transitory. In contrast to the effect of '914' and sulfarsenol, they found that stabilarsan, a combination of arsenobenzol with glucose, did not lower the coagulability of the blood, and they consider that the particular group in arsenobenzol which has this anti-coagulant effect is satisfied, or blocked, by previous combination with glucose.

Rabut and Oury record two cases in which, after series of injections of '914', the patients developed symptoms and blood pictures suggesting strongly those of aplastic anæmia. The coagulation time was lengthened in one case to twenty-five minutes and in the other to forty-seven minutes; there was irretractibility of the clot in both cases, and bleeding after puncture lasted from fifteen minutes to longer than an hour. In both cases there were great reductions in the number of red cells—to 2,500,000 in one and 1,800,000 in the other, with hæmoglobin percentages of 70 and 50 per cent, while the leucocytes were reduced to 1200 or 1000. On the other hand, no nucleated red cells or myelocytes were seen in the blood picture. The authors do not record the state of the bone-marrow after death. They discuss the question of purpura following arsenobenzol injections, and propose a classification on the following lines: (1) Isolated hæmorrhages; (2) Simple purpuric eruptions with or without hæmorrhage; (3) Rheumatoid purpura; (4) Acute purpura hæmorrhagica, of which the authors' two cases are quoted above. Under isolated hæmorrhages they class bleeding of the nose; hæmoptysis in latent tuberculosis; and prolongation of the menstrual flow and even metrorrhagia, of which they quote a convincing case. 'Purpuric eruptions' are subdivided into: (a) Simple purpuric erythema, usually affecting the legs and with a benign course. Also purpuric spots of various sizes from pin-head to large blotches of ecchymosis. (b) Purpura with hæmorrhages. Of this a case is recorded of bleeding from the buccal mucous membrane eight hours after an injection of 0.3 grm. '914'

in a subject who three months previously had completed a series of injections without event. The day after this injection there was epistaxis which lasted several hours; purpuric spots appeared on the skin, and hemorrhagic bullæ near the mouth. The symptoms disappeared in fifteen days. The authors emphasize as danger signals delayed coagulation of the blood, persistence of bleeding after puncture, and the change in the blood picture, and recommend a look-out for these signs of poisoning. They suggest as a possible cause the benzol combination rather than the arsenic, a conjecture which will doubtless be shared by other observers.

Variations in Toxicity of Different Batches of Arsenobenzol.—G. Fantl records that, after a long experience of neosalvarsan during the war in which he saw no serious toxic effects, he was troubled by a small outbreak of vasomotor symptoms accompanying or following the injection of neosalvarsan of certain batches. He suggests that possibly the severer toxic effects (encephalitis and dermatitis) might be traced to certain batches if their numbers were recorded. It may be mentioned here that this is done in this country in the case of arsenobenzol compounds used in public treatment centres, toxic effects with the batch numbers of the arsenobenzol preparations employed being reported to the Ministry of Health. Here it is possible to discover if the same batch has been concerned in toxic effects reported from a number of centres, and copies of the reports are sent to the Medical Research Council, who may submit suspected batches to re-test on animals. In these ways some batches have been incriminated and action taken which led to their withdrawal.

Avoidance of Immediate Toxic Effects of Arsenobenzol Injections.—It is well known to all workers with arsenobenzol compounds that certain patients are particularly prone to suffer immediate toxic effects, such as severe vasomotor symptoms, and some in such degree that arsenobenzol treatment cannot be administered to them intravenously in the ordinary manner. For these cases the reviewer prescribes the subcutaneous route, employing sulfarsenol. Pomaret, as a result of numerous experiments, has found that '606' precipitates albumins by virtue of the phenolic groups in its molecule, and this precipitating power is inhibited only by alkalization to an unsafe degree. The precipitate consists of a protein-arsenophenolic adsorption complex, which is soluble in alkaline fluids. On the other hand, '914' does not precipitate so strongly as does '606'; but if there is an excess of CO_2 in the blood, that effect may be pronounced in the case of '914' also. Pomaret considers that the precipitate is responsible for vasomotor symptoms with fall of blood-pressure following arsenobenzol injections. The symptoms are not, in fact, due to chemical poisoning but to physical changes (flocculation of the colloidal particles of serum). The author explains the fact that vasomotor symptoms are only occasional on the grounds of the solubility of the precipitate in an alkaline medium. The blood is both acid and basic: acid by virtue of its free acids, and basic because of its bicarbonates; that precipitates, this dissolves the precipitate. Animals in whom a certain degree of acidosis had been produced by a strictly meat diet suffered from some degree of lowered vascular tension after arsenobenzol injections. Pomaret found that patients who could not tolerate arsenobenzol injections because of vasomotor symptoms had secondary skin symptoms due to acidosis, this being shown by the high coefficient of acidity in the urine. He reviews the methods of avoiding vasomotor shock, which include the suggestion of Sicard to inject sodium bicarbonate, but concludes that there is no sure method, and therefore recommends the use of intramuscular injections, which are never followed by symptoms of shock. For this purpose he recommends his glucose compound, *Eparséno*. There is much in the clinical facts which agrees with Pomaret's findings. For example, the greater tendency of persons

who are fatigued to suffer vasomotor symptoms. The practical conclusion is that the urine of patients should be watched for acidity, and corrections made accordingly. It seems possible that the method of Sicard and colleagues, in which the solution is retained in the arm for some minutes, may act by allowing time for the precipitate to become redissolved.

Karl Schumacher has tested in 17 cases the method recommended by Sicard (MEDICAL ANNUAL, 1923, p. 450) of retaining the injected arsenobenzol in the arm vein for some minutes. He allowed from four to eight minutes to elapse after the injection before slowly releasing the tourniquet. The cases comprised sixteen women and one man who had been intolerant in spite of such precautions as injection of adrenalin or of calcium chloride. He found the method particularly successful in preventing these toxic effects, so that he was able to complete the course of treatment of all the cases without any more troublesome event than a slight rise of temperature. In the case of one patient, prior to the adoption of this method each injection was followed by depression lasting many days, rise of temperature, and very severe headache. None of those symptoms were experienced after the solution had been retained in the arm vein for some minutes following injection.

Dermatoses.—L. K. McCafferty records a case of lichen planus resulting from arsenobenzol injections. The patient, a mulatto woman, had received nine injections of 0·3 grm. '606' and six of mercury salicylate. After the third and subsequent injections she complained of burning pains in the stomach. At the time of the ninth injection the lichen eruption had commenced as a few violaceous papules on the arms. The condition became generalized, and clinically as well as histologically presented the features of lichen planus. The patient improved gradually, but seven months after the first appearance of the eruption there were still some papules. The author quotes a number of workers who have reported cases of arsenical dermatitis with lichenoid lesions. The condition is a very uncommon one, and the reviewer has seen only one case. McDonagh recommends the following treatment for dermatitis following arsenobenzol treatment. In the acute stages apply an antiseptic evaporating lotion :—

R	Plumbi Subacetat.	gr. x	Spt. Vini Meth.	℥j
	Calamin.	gr. x	Liq. Alumin. Acet. 1%	ad ℥j
	Creolin.	℥v		

To this some oil of eucalyptus may be added if the odour of the skin is very offensive. Pustular areas are cleansed with hydrogen peroxide, and moist areas such as the groins and axillæ dusted with :—

R	Bismuth. Subgallat.	℥j	Mag. Carb. Lev.	℥j
	Bismuth. Tribromphenol.	℥j	Pulv. Amyli	ad ℥j

When the desquamation stage is reached, the following ointment is applied :—

R	Sulphur. Præcip.	gr. xv	Ung. Bismuth. Oleat.	
	Ol. Theobrom.	℥j	Ung. Zinc. Oleat.	ad ad ℥j
	Aq. Rosa	℥ij		

The diet should be increased to a full one as soon as the temperature becomes normal, and large quantities of bland liquids should be imbibed. Potassium Iodide or Colloidal Iodine is given, the latter intravenously in doses of 50 to 100 c.c., and a non-metal injected, preferably Contramine, which is diethyl-ammonium diethyl-dithiocarbamate. For intravenous use, 0·25 grm. is dissolved in 10 c.c. physiological saline containing 10 per cent glucose. For intramuscular injections the same dose is dissolved in 2 c.c. saline, or tap-water. As a rule, five injections at five-day intervals are required, but in severe cases the injections

should be given every day or every other day. When boils appear, the pus is evacuated and dry dressings are applied. Also two intramuscular injections are given of Colloidal Manganese Hydroxide or, better, Manganese Butyrate, at intervals of three clear days. The author deprecates the use of more than three injections of manganese, as this results in aggravation of the condition. The recommendations are based on an experience of ten cases, of which six were treated with contramine. These recovered perfectly in a month, while out of four not treated with contramine, two died and two were still unable to get about at the end of three months. [It is possible that patients treated with contramine may be able to take a full diet as soon as the temperature becomes normal; but the reviewer's experience is that, if a full diet is given before the patient is well on the road to recovery, a relapse may be provoked.]

NEUROSYPHILIS.

The effect of treatment in preventing neurosyphilis is included in a paper by J. E. Moore on asymptomatic neurosyphilis. The author divides his cases of neurosyphilis into three groups based on the laboratory findings: Group I with slight lymphocytosis and increase of globulin but negative Wassermann and colloidal reactions. Group II with lymphocytosis of 10 to 100 per c.mm.; more globulin than in Group I; Wassermann reaction positive, if at all, only with large amounts of fluid; and either or both colloidal reactions positive, with a syphilitic curve. Group III with cells from 50 to 200; globulin much increased; Wassermann reaction positive with small amounts of fluid; and colloidal reactions paretic. Groups I and II respond to systemic treatment, but in Group III intraspinal treatment offers the only hope of 'serologic cure'. As regards the incidence of neurosyphi by races, he found Group I cases as frequently in whites as in blacks; Group II cases twice as common in whites; and the inveterate Group III, four times as common. This accords with the clinical finding that neurosyphilis does not affect blacks to nearly the same degree as whites. Analysis by sexes showed that the incidence of cases with changes in the fluid was equal in males and females. This is in marked contrast to the clinical findings, which in 763 cases of clinical neurosyphilis at the Johns Hopkins Hospital showed general paresis five times as common in males, tabes six times, and cerebrospinal syphilis three times.

The amount of previous treatment at the time of examination has a definite influence on the incidence of neurosyphilis, as shown in the following table for primary and secondary syphilis:—

Previous Treatment	Cases	GROUP			Per cent Abnormal
		I	II	III	
None, or very little	57	6	6	5	29.8
Six doses arsenobenzol with or without mercury	115	8	16	4	24.3
12 doses arsenobenzol with mercury	70	3	12	3	25.7
18 doses arsenobenzol with mercury	38	1	2	2	13.1
24 or more doses arsenobenzol with mercury	50	0	1	2	8.0

The author's chart of the findings after successive courses shows that there was a steady fall in Group I cases from commencement of treatment; but Group II cases increased to 17 per cent until two courses had been given, and then declined to 2 per cent after four courses. He attributes the initial rise

to insufficient treatment. Cases in Group III show little or no change in incidence even after four courses. The practical conclusion is that treatment should commence before cases fall into Group II, and the attack on the disease should be sustained. As to the incidence of the author's three groups of neurosyphilis in primary and secondary syphilis, the following table indicates clearly the danger of allowing the disease to proceed unchecked. The percentage of abnormal fluids is lower than that found by other workers, possibly because the specimens were taken after one or two courses of treatment.

	Cases	GROUP			Per cent Abnormal
		I	II	III	
Primary	67	3	9	2	20.9
Secondary	263	15	28	15	22.1

The effect of a lapse in treatment is shown in the following table :—

Treatment	Cases	GROUP			Per cent Abnormal
		I	II	III	
Regular	206	6	17	2	12.1
Lapsed	124	12	20	15	37.9

In this table the incidence of Group III cases amongst those who lapsed—that is, discontinued treatment after one to twelve doses of arsenobenzol—is remarkable.

The effect of systemic manifestations in the early stages on the development of neurosyphilis is indicated in a table which shows that in 72 early neurosyphilitic patients early systemic lesions had been mild three times as frequently as in 174 unselected cases of early syphilis. [This seems to show that the early systemic tissue reactions in syphilis result in the production of immune substances roughly in proportion to their intensity. In the same connection the reader is referred to animal experiments by Brown and Pearce (*MEDICAL ANNUAL*, 1922, p. 423), which showed that interference with the development of the initial sclerosis, without complete eradication of the disease, resulted in a greater proportion of animals developing lesions in other parts of the body (see also *MEDICAL ANNUAL*, 1923, p. 453). In another paper, reviewed below, Moore has produced evidence to show that pregnancy results in the production of immunity reactions which protect the central nervous system. Mention may also be made of the good effects of malarial infection in general paresis, and there seems little room for doubt that tissue reactions play a very important part in the protection of the central nervous system from attack by the virus of syphilis.—L. W. H.] At the same time a violent secondary eruption does not always protect, as is shown by the fact that 13.8 per cent of such cases in Moore's series had pathological fluid, 60 per cent of these being in Group II. The author's table giving the results of treatment of Group II cases shows that in 10 cases, courses of 8 to 12 weekly injections with intervals of 1 to 4 months, during which mercury and large doses of potassium iodide were given, resulted in serological cure after totals of 6 to 32 injections, with from 8 to 42 weeks of mercurial inunctions. On the other hand, two cases were worse after 10 and 12 injections of arsenobenzol, with 4 weeks' inunctions, and one improved only after 22 doses of 0.3 grm. '606' and 20 weeks' mercury. Group III cases were particularly intractable, and the importance of preventing patients falling into this group is made very clear by the author's investigation.

The author considers regular examination of the spinal fluid indispensable in the management of syphilis. It should be carried out after the first or second course of arsenobenzol injections. If the fluid is negative, the examination need not be repeated until the end of treatment and the subsequent period of observation. Stress is laid on the importance of the treatment being continuous in order to avoid all chance of neuro-recurrence. For this reason mercury is given in the intervals between courses of arsenobenzol, or slightly overlapping these. *The treatment of a patient with negative serum* consists of at least four courses of '606'. In the first course eight injections are given, and the interval between the first and second course is one month, which is occupied in mercurial inunction. The second and subsequent courses consist of six injections each, and the intervals are gradually lengthened. The treatment lasts a year, during which 26 injections of '606' are given, and 26 weeks of mercurial inunction. For early syphilis with positive reaction the treatment is extended to fifteen months, with five courses of '606' and 32 weeks of mercury. After completion of treatment the patient is kept under observation for a year and is not discharged unless there have been no symptoms, the blood has been negative six times, and at the end of the year the physical and neurological examinations, besides radiograms of the cardiovascular area and examination of the spinal fluid, disclose no abnormality. If the spinal fluid is found to be positive at the first examination, the above treatment and observation are modified according to the findings.

The reviewer would fully support Moore's appeal for thorough and continuous treatment, and his condemnation of the practice of giving a comparatively short course of treatment and waiting for the development of fresh symptoms, or a return of the serum reaction to positive, before resuming treatment. But the practical difficulty of carrying out the treatment in the form recommended by Moore is that it demands so much from the patient that he is apt to discontinue treatment. The average patient is one who, despite the doctor's advice, believes that he requires no more treatment after his blood has become negative, and his belief is strengthened in proportion to the inconvenience to which the further treatment puts him. Another practical difficulty is that inunctions make a great demand on man-power in the form of attendants, since each patient requires the undivided attention of one attendant daily for about twenty minutes if the inunction is properly carried out; and it is easy to understand that a comparatively small number of attending syphilitic patients would absorb the energies of a large staff. For these reasons it may be worth while to inquire if the ideal of continuous treatment cannot be carried out more easily, and it seems to the reviewer that the solution of the problem lies in the use of intramuscular injections of an insoluble preparation of mercury, or injections of bismuth, simultaneously with the arsenobenzol injections.

The Influence of Pregnancy on the development of neurosyphilis has been studied by J. E. Moore. It is well known that women suffer from general paresis to a much less extent than men. The cause is usually attributed to the smaller strain to which women are subject. Moore suggests, as a result of a statistical study, that pregnancy may be the protecting factor. He quotes Schmidt-Kraepelin, who found that the incidence of juvenile paresis, which generally occurs before the child-bearing period, is about equal in both sexes. In early cases of syphilis, Moore found the spinal-fluid abnormalities about equal in the two sexes—22.1 and 21.6 per cent. In late cases, however, he found only 6.47 per cent of his women suffering from neurosyphilis, in contrast with 20.38 per cent of males. The woman with late syphilis contrasts with the early syphilitic in having been pregnant more times. The proportions in the late cases were: cerebrospinal syphilis unclassified, 1 female to 2.48 males;

tabes, 1 female to 6.36 males ; general paresis, 1 female to 4.22 males ; meningeal syphilis, 1 female to 2.27 males ; vascular neurosyphilis, 1 female to 4.71 males. Abnormalities of spinal fluids were found in a lower proportion of late syphilitic women than of men whose age of infection was similar, though in these the proportion showing fluid changes was similar to that found in early syphilis. If the women are divided into those who have been pregnant and those who are sterile, the lower incidence of neurosyphilis is found to affect the pregnant class, the sterile women having the same proportion of neurosyphilis as males of the same age of infection.

The Penetration of Arsenic into the Parenchyma of the central nervous system after intravenous and intrathecal injections has been studied by Rudolf and Bulmer. They found that, after relatively enormous doses of arsenobenzol given intravenously, no arsenic could be detected in the spinal cord proper. The same result followed intrathecal injection, except when the dose introduced was enormously in excess of that which is considered safe for therapeutic purposes. They consider that any good effects recorded in syphilis of the central nervous system from the intravenous or the intrathecal injection of arsenobenzol cannot be due to the presence of the drug in the nerve tissues. [Presumably the authors are referring to the treatment of syphilis of the parenchyma of the central nervous system, since naturally the connective tissue infection, which is responsible for many forms of syphilis of the central nervous system, is fairly easily accessible to arsenobenzol introduced into the systemic circulation.—L. W. H.]

E. F. Buzzard holds that, if we are to reduce the incidence of parenchymatous neurosyphilis, we must pay no attention to the negative Wassermann reaction, but make the patient undergo treatment for life. In the treatment he would employ both Arsenobenzol and Mercury, but does not favour the intrathecal method.

Tryparsamide is strongly recommended for the treatment of neurosyphilis by Lorenz and colleagues. It is the sodium salt of n-phenyl-glycineamide-p-arsenic acid. Its trial was adopted not because of its spirochaeticidal properties, which are comparatively feeble, but because previous investigations by other workers had shown that it is well tolerated, has a marked tonic effect, and induces resolution and healing of syphilitic processes even in the presence of actively motile spirochaetes. In addition, the experimental evidence had shown that the drug has an affinity for the central nervous system, and the authors hoped, by its administration, to stimulate the defensive mechanism. It was found that, generally, a dose of 5 grm. given intravenously was well tolerated ; but a certain proportion of the cases developed dimness of vision after four or five such doses had been given, and the dose was finally fixed at 3 grm. dissolved in 10 c.c. water, given intravenously each week for eight weeks. In addition, 1 gr. of mercury salicylate was injected intramuscularly each week throughout the course, nine in all being given. The results appear from the account to have been very encouraging. Out of 42 cases of advanced paresis (asylum cases), 21 had been discharged and were at work. Out of 12 cases of less than six months' asylum life, 7 were discharged and 5 were mentally clear but retained in the institution because of positive laboratory findings. In both classes the remission had lasted from six months to two years, a length of time which is extremely rare in untreated cases of paresis. Good results were obtained also in syphilis of the supporting structures of the central nervous system in the asylum cases. In cases which had not been certified, 13 out of 14 paretics were arrested, all 8 cases of taboparesis, 3 out of 4 tabes, 7 out of 8 meningovascular syphilis, and all 7 cases of generalized syphilis. The effect on the Wassermann reaction of the serum and fluid and on other

pathological changes of the cerebrospinal fluid was equally remarkable. The patients improved greatly in nutrition, the average gain in weight being 20 lb. The authors recommend two or even three courses each of eight injections of tryparsamide, and nine of mercury salicylate, with an interval of five to eight weeks between two courses. The dose of tryparsamide is 3 grm. in 10 c.c. water given intravenously, and that of mercury salicylate 1 gr. intramuscularly three days before the tryparsamide injection. The treatment is also suggested for 'Wassermann'-fast cases and for those in which the nutrition is poor.

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SYPHILIS OF BLADDER. (See BLADDER, DISEASES OF.)

SYPHILIS, CONGENITAL.

Frederick Langmead, M.D., F.R.C.P.

DIAGNOSIS.—Of 100 cases which came under the observation of E. A. Morgan and M. A. Cox,¹ 64, or nearly two-thirds, were over 5 years of age. Thirty-one of these 64 presented themselves because of interstitial keratitis; 13 were referred because their parents had been shown to be infected; periostitis was the condition for which 4 patients sought relief, and cerebrospinal syphilis accounted for 6. Only one-fifth of the 100 cases had early manifestations severe enough to compel the parents to seek medical advice—a ready explanation for the discouraging results recorded in the treatment of the disease.

By far the most frequent early manifestation is 'snuffling' during the early months of life; if this is accompanied by enlargement of the spleen a tentative diagnosis of syphilis is justifiable. The rash is almost always of the maculo-papular form, while pemphigoid or pustular eruptions are almost never seen and did not occur in a series of 186 cases. [These statements lay their authors open to some criticism, since they are based on a comparatively small number of cases, most of which were seen after the early phases. No one will deny the frequency of snuffles in syphilitic infants, but unless this is accompanied by a profuse mucopurulent discharge it has no great

diagnostic value, since simple rhinitis due to catarrhal organisms is one of the commonplaces of an Infants' Treatment Centre. In this country a pemphigoid eruption affecting the palms and soles is certainly of great diagnostic value and is not rare.—F. L.] Syphilitic pseudo-paralysis of one or both upper extremities, without local signs of inflammation in the joint and without fever, occurred in 25 to 30 per cent of the cases. [This incidence, in our experience, is unusually great, though periosteal changes without producing the pseudo-paralysis are very common.—F. L.] To the text-book description of congenital lues these writers add a sign which they regard as of value—a frog-like appearance of the eyes, simulating at times a mild exophthalmos.

As they point out, there is little difficulty in recognizing the late manifestations of the disease when it is signalized by interstitial keratitis, Hutchinson's teeth, and periostitis. Other deformities of the teeth they consider of little value in diagnosis. This statement is confirmed by the criticisms which have been levelled at the sign described by Sabouraud—the presence of an accessory cusp on the upper first permanent molar tooth, for E. C. Sprawson² has found this cusp in 65 of 100 children who showed no signs of syphilis, while L. Bolk found it present in some degree in over 40 per cent of cases other than syphilis, and it has been found in Neanderthal man and anthropoid apes. Their experience of the Wassermann test has been that two successive negative results obtained on blood collected with reasonable precautions is positive evidence against the presence of congenital syphilis, provided that the patient is over 3 months of age and has not been treated. An interesting observation, which may prove useful in diagnosis, has been made by J. H. Stokes and B. S. Gardner,³ who demonstrated by X rays the presence of Hutchinson's deformity in the unerupted incisors of a girl 5 years of age (Fig. 82).



FIG. 82.—Unrupted Hutchinson's upper central incisors demonstrated by X rays in a child, age 5. (From the *Journal of the American Medical Association* '.) $\frac{1}{2}$ scale.

TREATMENT.—J. H. Sequeira⁴ divides preventive treatment of congenital syphilis into (1) prevention of infection of the mother, and (2) adequate treatment of the syphilized woman before or during pregnancy; he has no belief in 'paternal' syphilis. The disease, he holds, can be prevented in the following manner: (1) Every case of acquired syphilis, both in the male and female, should be treated early and completely. (2) Marriage should be forbidden until a condition of non-infectivity has been attained. This occurs, in his experience, if a person has had adequate antisyphilitic treatment, is free from all clinical evidence, and the blood has been negative to the Wassermann test for two years. Some observers, he owns, would also include an examination of the cerebrospinal fluid. There remain certain cases where the patient has had antisyphilitic treatment over a long period and the blood gives persistently a positive Wassermann reaction. In such cases there can be no certainty, and the risk, though possibly slight, must be explained to the patient. (3) It is advisable to obtain a Wassermann reaction in every prospective mother, bearing in mind that an occasional normal pregnant woman gives a positive reaction. In such cases, when there is no evidence or history of syphilis, he advises that the patient be observed carefully and that a further test or tests be tried later. (4) Every mother who has a positive Wassermann reaction and whose clinical history, or history of miscarriages, still-births, or syphilitic children shows that she is syphilitic, should receive antisyphilitic treatment

during each subsequent pregnancy. If the treatment is thorough, such pregnancies will certainly result in the births of healthy children. He lays special stress on the need for treatment during *each* subsequent pregnancy. (5) Every infant born of a syphilitic parent should be examined by the Wassermann reaction at regular intervals up to the second year. (6) With a view to preventing late congenital syphilis he has obtained examination as far as possible of all the children of syphilitic parents by the Wassermann reaction, and has thus been able to discover a large number of cases in which the disease has been latent and unrecognized.

The routine of curative treatment adopted by E. A. Morgan and M. A. Cox¹ is as follows: The intravenous injection of one of the arsenical compounds once a week for six weeks, followed by a course of mercury for six weeks. Blood for a Wassermann test is then taken, and if still positive the courses are repeated. This routine is continued until a negative test is obtained or the hope of securing it is regarded as small. The arsenical compound recommended is either **Sodium-diarsenol** or **Phenarsenamine**. All injections are intravenous, the veins used being those of the scalp, or of the antecubital space, or the external jugular. Mercury is given by inunction to the infants and by inunction and by the mouth to the older children, intramuscular injections being reserved for those children for whom it is suspected that the inunctions are being done unsatisfactorily at home. The neuro-syphilis cases were treated by intrathecal injection of **Salvarsanized Serum**. The results obtained in 100 cases were: probably cured, 44; much improved, 20; improved, 12; not improved, 21; died, 3. The first negative Wassermann is to be expected, on an average, at six months after the beginning of treatment. It must be remembered, however, that other workers have found that the Wassermann reaction returns sometimes after a long interval, even when treatment is continued. Interstitial keratitis, they found, was little if at all benefited by specific therapy. Cerebrospinal lues, if detected early, could be greatly improved and sometimes cured by intravenous and intrathecal treatment. In latent and tertiary syphilis the Wassermann reaction only became negative in about 11 months and 16½ months respectively. In securing successful results they emphasize the need for persistent and regular treatment, and the value of careful supervision of the child's dietary and routine of life in order to maintain general health and good nutrition.

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TABES. (See **BLADDER, AFFECTIONS OF**; **NEUROSYPHILIS**; **SYPHILIS**.)

TACHYCARDIA. (See **QUINIDINE**.)

TALIPES. (See **BONE AND JOINT SURGERY**.)

THORACIC SURGERY. (See also **EMPHYEMA**; **LUNG**.)

Sir W. I. de C. Wheeler, F.R.C.S.I.

Graham¹ states that thoracic surgery is now passing through the period of high mortality and indifferent results which characterized the field of abdominal surgery twenty-five years ago, and of the surgery of the brain even more recently. The old idea that a more or less rigid partition exists between the two pleural cavities is exploded. Instead of a rigid partition, the mediastinum in the normal subject is so mobile that any alteration in pressure on one side of it is accompanied by an alteration in pressure on the other side to almost the same extent. He draws attention to the now-accepted fact that open drainage of

an empyema is contra-indicated during the acute pneumonic stage. Early operation is followed by a high mortality—from 40 to 60 per cent. Early aspirations and late operation bring the mortality down to about 5 to 10 per cent. Acute empyema should be treated by a plan of rapid aspirations during the pneumonic stage, to be followed by free drainage. It is beyond argument that intrathoracic operations can be performed upon many patients with a disregard of any form of apparatus for differential pressure. These are patients who have extensive adhesions or rigid mediastinal pleura. Others, however, will go through intrathoracic operations much more safely if there is some plan to assist in inflating the lungs if necessary. It has been suggested that the use of an ordinary nitrous-oxide machine with a tightly-fitting inhaler is quite satisfactory. In thoracic work, local anaesthesia combined with nitrous oxide and oxygen is excellent. At any time during the operation the lungs can be inflated. In any event, whether or not apparatus for differential pressure is used, it is wise for the surgeon to remember that too large an opening may cause death, and, to avoid fatal asphyxia, the opening should be closed if necessary by plugging it with lung delivered out of the incision, or in some other way. [The lung can be inflated by blowing through the face-piece of an ether inhaler (*see Fig. 79*).—W. I. de C. W.]

LUNG ABSCESS.

Surgical Drainage is not necessary in all cases of *acute lung abscess*. Some clear up rapidly, with or without the help of **Vaccine Therapy**. Some are cured by the production of artificial pneumothorax; but this method is not without danger, and, if used at all, must be early for relatively small abscesses without adhesions.

[The reviewer drains lung abscesses in the following manner. (An exactly similar method of drainage is employed for empyemata, and in certain cases of drainage of the gall-bladder and urinary bladder. It is a curious fact that many surgeons will drain pus or fluid from a cavity by a different method in every part of the body; similarly it will be noticed that certain surgeons will wash out the stomach by one method, the rectum by another, the bladder by a third, and so on. If a tube and glass funnel are used for washing out the stomach, a tube and glass funnel are equally good for use with the rectum and bladder; and so it is with drainage. Some simple uniform method should be developed applicable to various conditions in different parts of the body. The following suction drainage is admirable, and in chest cases, whether the lung or the pleural cavity is involved, suction is an essential adjunct to simple drainage. There is no cough and no expectoration after the operation for drainage of a lung abscess if this method is used.)

The abscess is located by percussion and other physical signs and by X-ray photographs. Usually the parietal and visceral pleura are adherent, and, when the rib over the abscess is removed, consolidated lung presents. An exploring needle with syringe attached searches for the pus, and a knife is driven into the cavity when this is found. The opening is enlarged with the finger, and a drainage tube inserted into the cavity with the thumb-piece of a rubber glove or finger-stall applied (*see MEDICAL ANNUAL, 1922, p. 456, Fig. 82*). The suction bottles are attached to the tube; pus and mucous secretions are drawn into the bottle as they are formed. The patient's convalescence is rendered remarkably comfortable. After four or five days the suction drainage may usually be stopped; but if the discharge is still profuse, the tube is changed when the glove portion becomes loose.

When a rib is removed and adhesions are not found, a pneumothorax is

formed, and the lung must be grasped and pulled into the wound and the abscess searched for at a second operation. If a two-stage operation is decided upon, the aspirating needle should not be used at the first operation. On one occasion the pleura was opened because the incision was made too low, but iodoform gauze was packed round the opening, and the abscess of the lung sought and found higher up at the same operation. No empyema followed; the patient got well rapidly. The case in question was of old standing, and the patient was suffering from repeated pulmonary hæmorrhage.—W. I. de C. W.]

Graham, in his interesting paper, points out that the drainage of all long-standing abscesses is not followed by recovery, and that very often drainage is impossible owing to the honeycombed condition of the lung. In certain cases, removal of the portion of the lung involved is the only hope of a tolerable existence. He refers to the literature on lobectomy, and says that in only 17 per cent have complete successes occurred. He suggests, after an experience of two cases, the burning out of the portion of diseased lung with an actual cautery heated to a dull-red heat.

Lockwood² gives an exhaustive account of abscess of the lung. Like other writers, he is impressed by the high percentage of patients in whom the condition follows operation around the nose and throat, and particularly tonsillectomy, especially when general anaesthesia is employed. In 25,000 tonsillectomies performed at the Mayo Clinic, where local anaesthesia is largely employed, there has been one case only of lung abscess.

Abscesses of the lung may be large or small, single or multiple, acute or chronic. A distinction between gangrene and abscess may be uncertain, even at necropsy. The simple acute abscesses have necrotic walls, and have almost no line of demarcation from the healthy lung tissue. The majority of abscesses develop in the peripheral portion of the lungs, and occur, according to some authorities, three times as often in the right lung as in the left.

Abscesses following pneumonia and influenza are practically always peripheral, and usually involve the visceral pleura. According to Tuffier, 80 per cent of pneumonic abscesses are in the lower lobes. In the closed type of abscess there is usually a peculiar putrid odour from the breath, even though there is no sputum. The presence of elastic fibres can be often, but not always, demonstrated in the sputum. Pulmonary abscesses often run a peculiar recurrent course, and it must be borne in mind that dullness, diminished breath-sounds, and tactile fremitus may be due to the thickened pleura over the abscess, or to empyema. Important signs are diminished excursions of the chest wall over the involved area, and retraction in the interspaces usually present when adhesions are well formed.

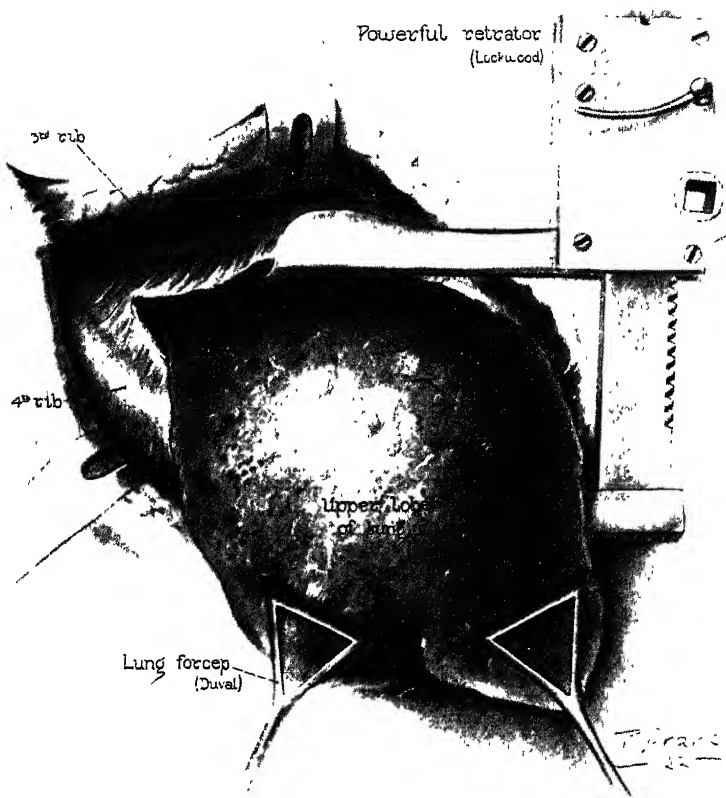
Needling of a pulmonary abscess as a diagnostic method is mentioned only to be condemned. Cerebral abscess is a grave complication. These cerebral lesions are due to detachment of infected emboli from the pulmonary veins; they are more often multiple than single, and produce a syndrome like Jacksonian epilepsy. Lockwood draws attention to the onset of diarrhoea in these cases. It is very often a late evidence of pyæmia.

MEDICAL TREATMENT.—Mix says there is no medical treatment for pulmonary abscess, and other authorities are quoted in this paper as saying that the treatment of acute lung abscesses by medical agents, pulmonary inhalant, antiseptics, posture, and the like, carries with it so high a mortality that it might better be discarded. Notwithstanding these opinions, Lockwood believes that every patient should be given a thorough trial of medical treatment, as follows: **Rest** in bed in the open air; frequent feedings of **Highly Nourishing Foods**, and **Sodium Bicarbonate**, from 100 to 120 gr. in the twenty-four hours, to offset acidosis; **Glucose** should be given for similar reasons.

PLATE XLIV.

ABSCESS OF THE LUNG

(LOCKWOOD)

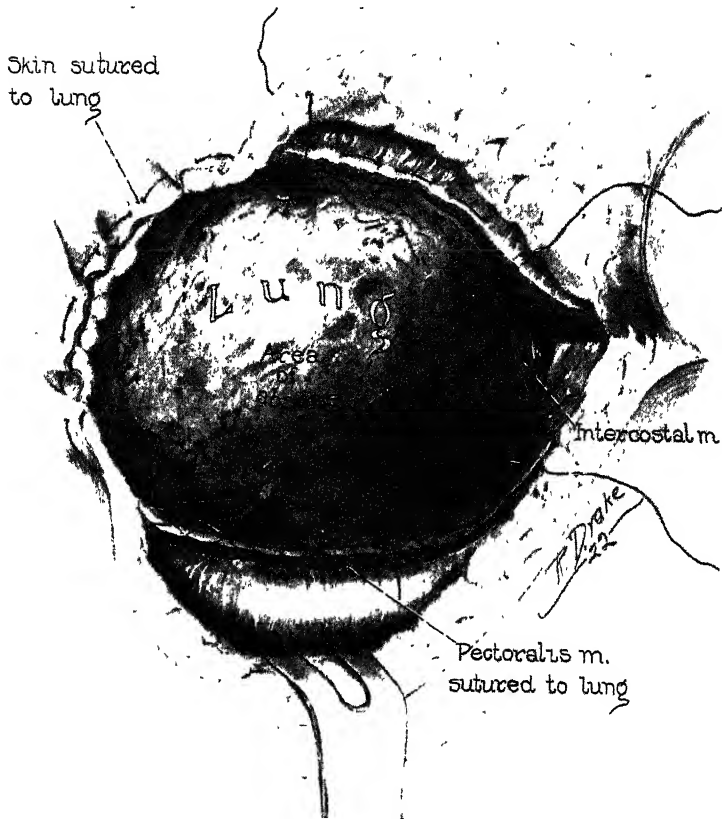


Exposure of the upper lobe through an intercostal incision

*Plates XLIV, XLV, XLVI kindly lent by
'Surgery, Gynecology, and Obstetrics'*

PLATE XLV.

ABSCESS OF THE LUNG—continued



Three rows of sutures on the left lung: first, intercostal structures; second, pectoral muscles; and third, skin.

PLATE XLVI.

ABSCESS OF THE LUNG --continued

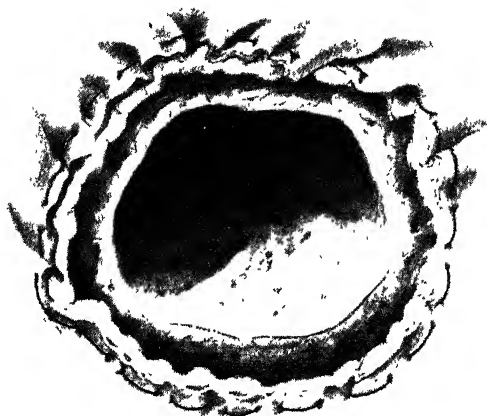


Fig. 1. Cavity of abscess, and skin suture covering the first two rows of sutures.

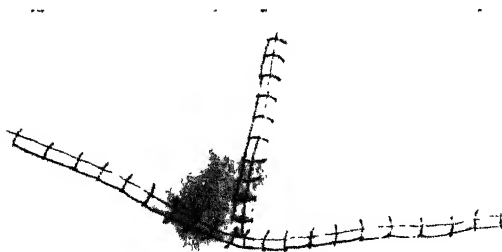


Fig. 2. Flap embedded in the abscess cavity

INDICATIONS FOR OPERATION.—1. Operations should be undertaken for all patients who, after a thorough trial of medical treatment, are no longer improving or holding their own.

2. Early operation is advisable in all cases of fair-sized patent cavities surrounded by markedly fibrosed or calcareous walls.

3. Pneumothorax may be advisable in all cases of small, completely encapsulated abscesses not connected with a bronchus. If pneumothorax does not improve the condition, operation should be undertaken early.

4. After thorough medical treatment to put the patient in the best possible condition for operation, surgery should be resorted to in all cases in which an abscess surrounds a foreign body imbedded in the parenchyma, or in which a foreign body in a bronchus cannot be removed through the bronchoscope.

5. Early operation is advisable for patients with very large abscesses even though the patient's general condition is fairly good, since there is a possibility that they will be drowned in their sputum.

6. There is a small percentage of patients who have developed very large abscesses and whose general condition is very bad, in whom drainage is urgently necessary, regardless of the great risk, because they produce such quantities of pus that they are in danger of drowning themselves.

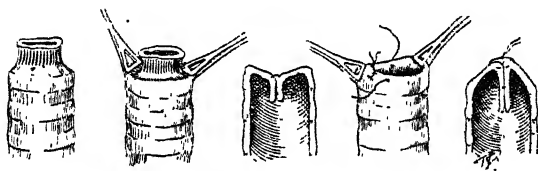


Fig. 83.—Steps in the closure of a bronchial fistula.

(Kindly lent by 'Surgery, Gynecology, and Obstetrics'.)

OPERATIVE TREATMENT.—The illustrations (*Plates XLIV, XLV, XLVI*) indicate the management of a case of abscess of the lung without adhesions. The abscess is opened without an anæsthetic at the second operation. In most cases it is wiser to wait three or four days until granulations are formed, before opening the abscess. Empyema is a serious sequela, and must be drained or dealt with by aspiration. When the abscess cavity is freely drained, it can be closed by skin flaps, as shown in *Plate XLVI, B*.

Bronchial fistula following and persisting after operations is treated by the operation shown in *Fig. 83*.

THORACIC TUMOURS.

Wilensky³ discusses the surgery of thoracic tumours. He thinks that intratracheal, intrapharyngeal, or other forms of differential pressure anæsthesia are not essential, although they are helpful. He emphasizes how important it is for the general practitioner to learn the lesson that, when obscure intra-thoracic conditions do not clear up fairly promptly, the chest should be opened and adequately exposed.

Access to the interior of the chest can be obtained in a number of ways : (1) Resection of one rib ; visibility is bad and manipulations are difficult. (2) A trap-door is cut in the chest : visibility is fair, and access to the organs only moderate. (3) A long intercostal incision is made in the sixth or seventh interspace, and the ribs are forcibly separated by a powerful retractor. One or more ribs may be divided at the posterior extremity near their angles to obtain extra room. He states that for work on the lungs and diaphragm, or

for intrathoracic cesophageal operations, the incision is not surpassed by any method. [In the hands of the reviewer this method employed with the use of Tuffier's retractor gives simple and adequate intrathoracic exposure (*Fig. 84*)—W. I. de C. W.]

The immediate dangers of intrathoracic operations include the following:

(1) Acute pneumothorax. (2) Mediastinal flutter. Wilensky says that the important lesson to be remembered in operating within the thorax, especially upon the lungs, is that the mediastinum can be steadied by traction upon the root of the lung or upon the stumps of the lobes after lobectomy. (3) Hæmorrhage and shock. (4) Opening of the pericardium when operating on the left side is a serious complication.

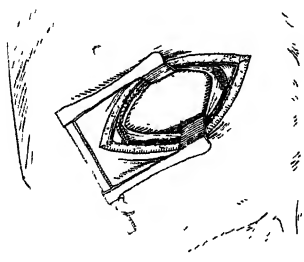


Fig. 84.—Tuffier's rib-spreading retractor in position. (*Fedraon from Wheeler's 'Operative Surgery.'*)

The operability of thoracic tumours and the risks entailed are determined upon general and local grounds. Separate consideration is given to tumours of the chest-wall, pleura, lung, and mediastinum respectively.

Chest-wall Tumours.—About 72 per cent are malignant. A radical operation is possible in about 20 per cent. The operative technique is not exceptionally difficult. A block excision of the tumour-bearing portion of the chest-wall is done by division of the ribs and soft parts; the extirpation naturally requires a sudden acute pneumothorax and collapse of the lung. In the lower ribs the diaphragm must be cut into, so that frequently there results a combined thoracotomy. Intratracheal or intrapharyngeal anaesthesia is especially useful in chest-wall tumour extirpations. At the conclusion of the operation it is of great importance to be able to distend the lung completely and suture it to the margins of the resultant chest-wall opening. The latter is closed by a plastic of the adjoining skin and soft parts. In certain locations—the anterior thoracic wall—the opposite breast can be mobilized and displaced across to the operated side to obturate the opening; this technique is especially useful with carcinoma of the breast involving the chest-wall. When no other technique is available, the opening is plugged with gauze. Operations done in more than one stage may be helpful.

Pleural Tumours.—(1) Benign—lipomas, chondromas, and fibromas; (2) Mixed tumours; (3) Malignant tumours. Operation is only possible in about 27 per cent. The late results are very bad.

Lung Tumours.—Practically all the ordinary varieties of malignant tumours are found in the chest. The primary lung tumours are much less common; benign tumours are very infrequent, and are usually found at autopsy. Much experimental work has been done on animals in the removal of one or more lobes of the lung. It is far more difficult in human beings. If the tumour is technically removable, the portion to be excised is delimited and is tied in sections with a number of chain ligatures. The tissue is divided with the knife or, better, with the cautery. The bronchial stump is always a matter of difficulty, and fistula formation is exceedingly common. The simplest method is to crush the stump with a heavy clamp and ligature. The fistula, if it occurs, often closes spontaneously. Extirpation of the lower lobes is less difficult technically, and is less dangerous clinically, than excision of the upper lobes.

Mediastinal Tumours.—Primary tumours chiefly arise in the lymph nodes and take the form of Hodgkin's disease and lymphosarcoma. Patients

PLATE XLVII.

THORACIC TUMOUR

(WHEELER)



Intrathoracic fibroma. Antero-posterior view.

By kind permission of 'The British Journal of Surgery'

PLATE XLVIII.

INTRATHORACIC FIBROMA

(T. P. DUNHILL)



Showing where the capsule of the tumour was attached to the vertebra. $\frac{1}{2}$ nat. size.

By kind permission of 'The British Journal of Surgery'

with far-advanced tumours of the mediastinum lead a wretched existence. Compression of the large vessels, the superior and inferior vena cava, and all important nerve trunks, makes life miserable. In advanced cases, a palliative operation can be done to provide additional room in the bony thoracic cage for the increasing growth of the tumour, so that extreme discomfort can be alleviated. These decompression operations serve a similar purpose to those practised on the skull for the relief of brain tumours. The bony chest wall can be divided: (1) Through the middle of the sternum transversely or, better, longitudinally; or (2) Directly alongside of it.

Wilensky does not mention lipomata and fibromata, but calls attention to the presence of mediastinal dermoids and teratomata. It is too often assumed that intrathoracic tumours, causing pressure symptoms and demonstrated by X rays, are necessarily malignant.

Lipomata and fibromata are not uncommon. The non-malignant tumours may cause cough, shortness of breath, gradually developing into an alarming dyspnoea; œdema of the lower extremities and abdomen may supervene.

Dunhill⁴ mentions two cases of intrathoracic enlargement of the thyroid gland, which occupied so deep a position in the mediastinum that the approach was only possible by splitting the sternum. The same author describes the case of a male patient, age 35, suffering with symptoms of intrathoracic pressure. There was cyanosis of the head and neck and upper extremities. The right upper arm was $1\frac{1}{2}$ in. larger than the left: an X-ray picture (*Plate XLVII*) confirmed the diagnosis. An incision was made as shown in the illustration (*Fig. 85*), and was designed with the idea that the growth might be an intrathoracic goitre; the sternum was divided (*Fig. 86*), and the intercostal tissues were freed. The internal mammary vessels were ligatured and cut above and below, and an osteoplastic flap thus raised. The tumour was exposed, and filled the dome of the right thoracic cavity, displacing the pleura downwards; behind it was closely applied to the ribs, and firmly attached to the bodies of the vertebræ. The lower part seemed to be in contact with the base of the heart and great vessels. A month later, when permission was obtained, the tumour was removed; intratracheal anæsthesia

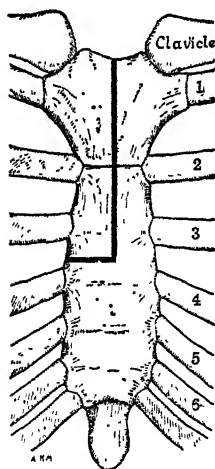


Fig. 86.—Line of division of sternum.

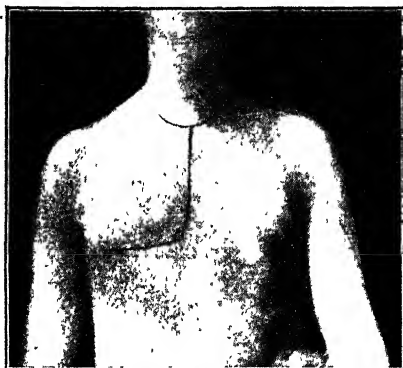


Fig. 85.—Intrathoracic fibroma: the incision.

was employed. The tumour weighed 1 lb. $3\frac{3}{4}$ oz., and was composed wholly of fibrous connective tissue. *Plate XLVIII* shows where the capsule of the tumour was attached to the vertebræ.

RÖNTGEN-RAY TREATMENT OF INTRATHORACIC TUMOURS.—Wilensky sums this up as follows: Tumours of the lung of the types usually found do not

lend themselves readily to any beneficent effect from treatment with the Röntgen ray or radium. Much better results are obtained with the tumours originating in the lymph nodes. There seem to be better average results in lymphosarcoma than in Hodgkin's disease, but in both the tumours can be caused to shrink and to disappear. Unfortunately, however, these are usually only temporary phenomena, and the tumours rapidly recur. Lewis had a case in which a mediastinal tumour recurred three times after the apparent disappearance which followed radio-active therapy; finally the tumour recurred for the fourth time, and the condition ultimately proved fatal. In none of these types of tumour does the disappearance of the tumour coincide with any change in the blood findings. It is to be hoped that with continued experience much more knowledge will be obtained which will permit a more effective and lasting disappearance of these tumours. Where the tumours are accessible, technically operable, and can be safely removed with the knife, the latter method is still the preferable one. Otherwise the tumours should be attacked with the Röntgen ray or with radium. In operated cases the latter should be employed as a subsidiary measure.

Rowlands⁵ describes three interesting cases in connection with thoracic surgery. The first was a *sarcoma of the chest wall*, 5 in. long and 4 in. broad, and inseparable from the lower ribs. The whole thickness of the chest wall, including the tumour, was incised, thus making a very large opening into the right pleura. The whole of the right lung, the dome of the diaphragm, the wall of the pericardium, and the descending aorta, were very evident. The opening in the chest wall was closed in layers. The wound healed primarily, and the pneumothorax gradually absorbed. The patient travelled home ten days afterwards.

In the second case, a large *hydatid cyst* was removed from the lower lobe of the right lung; the cyst was as large as a coconut, and was shelled out through a wide opening in the pleura.

The third case was a *diaphragmatic hernia*. X-ray photographs showed the whole of the stomach and the splenic flexure above the diaphragm. An 8-in. incision was made over the eighth left rib, which was removed, and the chest opened. The stomach, the splenic flexure of the colon, and the spleen were lying in a large serous cavity. The opening in the diaphragm was 4 in. long and 1 in. wide, and placed near the back. The opening was clearly congenital, and consisted of a slit between the lumbar and costal fibres. After separating the adhesions, the viscera were returned to the abdomen and the opening in the diaphragm was closed. The parietal opening was then completely closed without a tube. The patient made an uninterrupted recovery.

CARCINOMA OF THE ŒSOPHAGUS.

The paper by Graham,¹ already referred to, concludes with a section on carcinoma of the Œsophagus. In one case, operated on by Lillenthal, the posterior mediastinal approach was used, and a cuff of skin was employed to restore the lumen of the resected Œsophagus. Infection of the mediastinum has proved fatal in many attempted cases, and the surgery of carcinoma of the Œsophagus is at present in a most unsatisfactory position.

PULMONARY TUBERCULOSIS.

Riviere and Romanis⁶ discuss the operative treatment of tuberculosis. The object of surgery is to obtain collapse and splinting of the tuberculous lung in order to produce the fibrosis and cure which result from the splinting of joints and other organs in the body.

The writers come to the following conclusions :—

1. Chest operations rapidly and skilfully carried out under gas and oxygen are remarkably well tolerated by tuberculous patients—much better than preconceived ideas would have suggested. They incline decidedly to gas and oxygen in preference to local anaesthesia.

2. They are in favour, so far as possible, of extrapleural operations, in preference to the intrapleural division of multiple adhesions.

3. Of extrapleural operations, the stripping of parietal pleura from the deep fascia (pneumolysis) is the simplest and shortest, provided a suitable medium could be discovered for filling the space. It has the advantage that localized collapse can be applied to localized disease, without the necessity of complete lung collapse.

4. Pneumolysis is undoubtedly accompanied by real risk of sepsis, and Tuffier, its originator, was concerned to devise special measures for its avoidance. The establishment of an extrapleural pneumothorax is somewhat difficult and not without risk; adipose tissue, as a filling, is difficult to obtain; paraffin is apt to be returned. This latter accident is probably avoided, in threatening cases, by the aspiration of serous fluid, which tends to be formed and to collect round the paraffin in these cases.

5. The efficacy of paraffin replacements is probably reduced by the fact that no such immobilization of the collapsed area occurs as after extensive rib resection. Furthermore, the localization of the collapse is also, probably, less than might be hoped for.

6. For the majority of cases in which operative measures are needed for the collapse and immobilization of an adherent tuberculous lung, a well-devised thoracoplasty seems to us to offer the best results. The operation is less severe, in skilful hands, than might be expected, and the conditions obtained are very favourable for the arrest of pulmonary tuberculosis. The better lung must be scrupulously investigated, and the best moment chosen for the operation. A reactivation on the side of operation may be met by further resection of ribs, but an extension of disease in the functioning lung admits of no alleviation. This operation, if indications and contra-indications are strictly followed, is likely to gain a wider acceptance in coming years.

REFERENCES.—¹*Jour. Amer. Med. Assoc.* 1923, June 23, 1825; ²*Surg. Gynecol. and Obst.* 1922, Oct., 461; ³*Amer. Jour. Med. Sci.* 1922, Oct., 573; ⁴*Brit. Jour. Surg.* 1922, July, 4; ⁵*Lancet*, 1923, i, 16; ⁶*Ibid.* 521.

THROMBO-ANGIITIS OBLITERANS.

Drs. C. Lian and L. Pollet.

(Translated by Carey F. Coombs, M.D., F.R.C.P.)

Thrombo-angiitis obliterans¹ is a rare disease which must not be confused with arteritis obliterans. It attacks emigrant Jews from Russia or Poland, and is almost absolutely limited to men between 20 and 40. Its lesions attack the arteries and their accompanying veins. The obliterating clot becomes organized and fibrous, while the fibrous tissue invades the vessel walls and the neurovascular sheath. The pain, which is the chief symptom, makes life unbearable. Many treatments, most of them unsuccessful, have been tried in order to give relief. Counter-irritation and passive hyperæmia are useless. Morphia and its derivatives are dangerous, because the injections have to be often repeated, and in the end become ineffective. Repeated intravenous injections of citrate of soda, the intensive use of Ringer's solution by duodenal and subcutaneous routes, are tedious and often ineffective. Surgical methods are deceptive. Arteriovenous anastomosis is illogical, for both vein and artery are thrombosed. Tying the femoral vein has not been successful. There is more to be hoped for from Leriche's peri-arterial sympathectomy; yet, according

to Silbert,² it has been tried many times without much benefit. In fact the intensity of the pain often compels resort to amputation after other plans have been tried, even in the absence of much gangrene. Thus it is interesting to note the appearance of two new plans of treatment which have afforded success to their authors.

Injection of Alcohol into the Posterior Tibial Nerve at the Instep.—Silbert believes that the pain arises from the fact that the nerves are gripped in the fibrous tissue surrounding the blood-vessels, and so far injured as to undergo a complete secondary degeneration, and that these lesions occur especially below the knee. His proposal is to get rid of pain by injecting absolute alcohol into the nerve at a point as near the periphery as possible. In the cases reported, success was obtained by injecting the posterior tibial nerve at the level of the internal malleolus under local anaesthesia. If this fails, the injection should be repeated at a higher level, up to the lower part of the popliteal space, in one or two of the nerve-trunks. It is important to choose a level below the point at which the motor nerves of the leg come off, so as to avoid paralysing them. If the injection is made at the ankle, tissues of low vitality have to be incised, but these will unite by first intention if asepsis is perfect. Injection of alcohol into the neighbouring soft parts must be avoided. Immediate relief to pain follows, with anaesthesia of the sole of the foot and paralysis of the intrinsic muscles of the foot, which makes practically no difference to walking. In the three cases reported by Silbert there were no trophic disturbances. The good result was still persistent six to eight months after injection.

Repeated Injections of Antityphoid Vaccine.—Goodman and Gottesman,³ taking their stand on the brilliant results obtained in chronic inflammation by injection of foreign proteins, have treated three cases of thrombo-angiitis obliterans by injection of stock antityphoid vaccine. They chose this vaccine because it was easy to get and to use. They gave weekly intravenous injections for two or three months in small doses, just sufficient to provoke a slight febrile reaction with the least possible discomfort. They began with $\frac{1}{4}$ c.c., going up to $\frac{1}{2}$, $\frac{3}{4}$, or 2 c.c. They were dealing with cases in which the pain was so bad as to resist morphia, and this was definitely relieved.

REFERENCES.—¹*Med. Annual*, 1910, 162; 1916, 103; 1917, 99; 1918, 849; 1919, 427; 1922, 463; ²*Jour. Amer. Med. Assoc.* 1922, Nov. 18; ³*N.Y. Med. Jour.* 1923, June 20.

THYROID GLAND, SURGERY OF. *Sir W. I. de C. Wheeler, F.R.C.S.I.*

The study of the thyroid gland and its functions, especially with a view to the curative effects of operative surgery, still occupies the attention of many authorities. It has been pointed out (MEDICAL ANNUAL, 1923) that there are probably only three definite types of goitre—colloid, adenomatous, and exophthalmic. Every goitre operated upon by the writer during the last fifteen years, exclusive of the toxic type, contained one or many adenomata. The colloid goitre of youth is not a surgical disease; the thyroid should not be removed in such cases, and the condition usually disappears under the administration of iodine. Occasionally a colloid goitre will be mixed with adenomata, and then the colloid portion disappears and the adenomata remain. Surgical interference should be postponed in such cases, when the patient is young, as long as possible. It is a serious matter to remove any considerable portion of the thyroid gland in young adults. The operation of thyroidectomy cannot be uniformly standardized, and thus surgeons who are interested in the subject should be familiar with three types of operation:—

1. The classical removal of one lobe, after the method made popular by the late Theodor Kocher. It consists in dividing the structures in front of the

enlarged lobe, dislocating the lobe, ligature of the superior and inferior thyroid arteries with the lateral and accessory veins, crushing the isthmus, and removal of the lobe, taking care of the recurrent laryngeal nerve. In order to prevent injury to the latter, and to avoid free exposure of the trachea, a small portion of the gland may, with advantage, be left in these situations.

2. When the enlargement is produced by one or two large adenomata, it will be found difficult to dislocate the lobe and to secure the thyroid arteries, which are often inaccessible. In such a case the capsule of the goitre is in all respects similar to the capsule produced in the case of an adenomatous prostate. It consists of flattened-out thyroid tissue surrounding the adenoma. This capsule of thyroid tissue should be freely incised, and the adenoma shelled out from its bed, just in the same way as an enlarged prostate is enucleated. There will be hæmorrhage for a few moments, but it can be easily controlled.

3. When both lobes are enlarged, it is necessary, for the sake of symmetry and in order to remove enough gland in toxic goitres, to excise a portion of each lobe. This is accomplished by taking a large wedge from each lobe. The knife enters the gland substance in this operation, and thyroid tissue is left in each side corresponding to the size of the normal gland. The hæmorrhage is controlled by placing a series of clip forceps, one in the region of the superior thyroid, one in the region of the inferior thyroid, and three or four forceps between these two. Inconvenient hæmorrhage is thus controlled, but the operation is not so bloodless as that of lobectomy.

Administration of Iodine in Toxic Goitres.—As a result of the experiences and recent teachings of Plummer and others, the writer does not hesitate to give iodine solutions to cases suffering from toxic goitres. It has been found that the administration of Lugol's solution in 10-drop doses daily diminishes—sometimes in a dramatic manner—the signs and symptoms which characterize the disease.

In a recent visit to the Mayo Clinic, numbers of patients who were taking Lugol's solution were interviewed, and they stated that the tremors, the palpitation, the feelings of unrest and nervousness all diminished or disappeared under this treatment.

It is possible that the thyroid under intensive stimulation, as in exophthalmic goitre, produces a perverted and incompletely formed secretion, and that the administration of iodine permits of a more normal product.

It appears probable, judging from the work of Plummer, that basal metabolism will be elevated more from a given amount of an incomplete molecule than from the same number of complete molecules of thyroxin. If the theory is correct that incomplete molecules of thyroxin in the body can be iodized by the administration of iodine solutions, such as Lugol's solution, the basal metabolic rate should drop, and this actually occurs, *pari passu* with the diminution of the clinical signs and symptoms.

Furthermore, the administration of iodine may diminish the discharge of incompletely built-up thyroxin molecules from the thyroid. It must be understood that iodine should only be administered for long periods with caution, even though it has been proved that the result of its administration for a short period is beneficial.

In the Mayo Clinic, for the past twelve months, Lugol's solution in 10-drop doses is administered to patients for six or more days, as part of the preparation for operation for exophthalmic goitre. On the fourth to the sixth day there is a marked reduction in basal metabolism; the nervous phenomena diminish, the 'stare' becomes less prominent.

A certain percentage of cases, after removal of two-thirds or more of the

thyroid, return after variable lengths of time with tachycardia, insomnia, and nervous phenomena. The body weight is normal, the metabolic rate is raised. Such relapses and disappointments after operative treatment may be explained on the hypothesis that the remnant of hypertrophic thyroid discharges a relatively high amount of incompletely iodized thyroxin molecule. Theoretically, these patients should do well on Lugol's solution, and, as a matter of fact, its administration in such cases produces a beneficial effect in a dramatic manner. The basal metabolism drops to normal or to below normal within seven days, and the patients feel so much better that they regard the iodine solution as in the nature of a strong sedative.

To sum up: (1) Lugol's solution should be given to all cases of exophthalmic goitre for six to ten days before operation, in order to prevent crises and post-operative hyperthyroidism. (2) Lugol's solution should be administered to patients who have recurrence of nervous symptoms after operation for toxic goitre. (3) Lugol's solution may be tried as part of the treatment in cases which refuse operation, but, until further data are forthcoming, prolonged administration of iodine solutions should only be tried with caution.

In operating upon cases of toxic goitre, this last procedure (No. 3) is strongly advised. It must be remembered that it is necessary to remove the greater portion of the gland. This involves something more than lobectomy. It is not a safe procedure to remove one lobe completely, to detach the isthmus from the trachea, and then to proceed with the removal of the greater portion of the second lobe. The chief danger lies in the fact that the trachea becomes widely exposed, that the recurrent laryngeal nerves may be dragged upon and with injury; and these factors, combined with the fact that the superficial laryngeal muscles have been divided, may bring about conditions which render respiration difficult or impossible. The writer has seen one death from these causes.

The safest operation is a partial removal of both lobes. By removing a deep wedge of gland tissue from each lobe, the safety of the posterior part of the capsule is assured, and with it the parathyroids and the recurrent laryngeal nerves. Exposure of the trachea is reduced to a minimum.

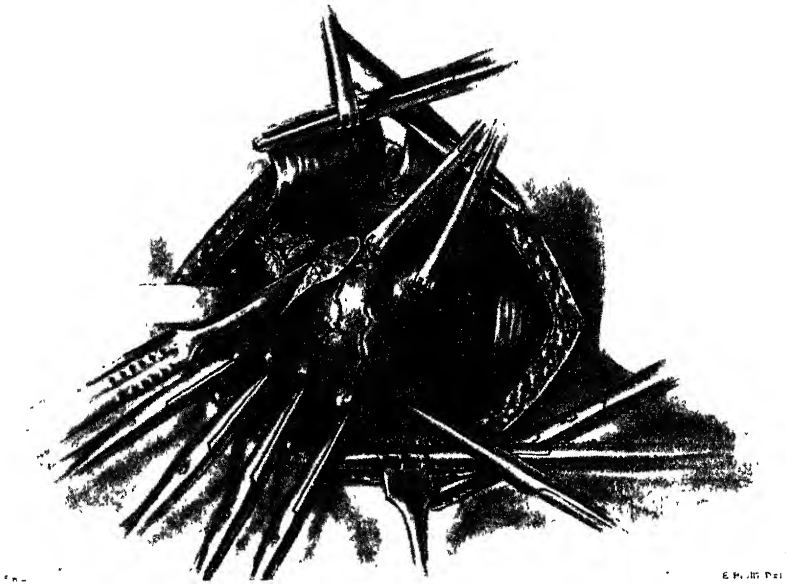
Lahey¹ discusses the *technique of thyroidectomy*. In taking out a wedge of gland, mentioned above as a suitable operation when both sides are involved, he ligatures and divides the superior pole, and then proceeds as is shown in the illustration (*Plate XLIX*).

Porter² analyses *end-results in thyroid surgery*. He refers to 19 cases of malignant disease of the thyroid: 4 were classified as sarcoma, and 15 as carcinoma. A combination of X-ray treatment and operation resulted in three cures. Porter thinks that cancer of the thyroid occurs primarily in people beyond middle life, usually as a unilateral, less frequently as a bilateral, goitre. In another type the cancer develops in a tumour of long duration. Particularly unfavourable are the cases in which the tumour is fixed in the trachea, with paralysis due to involvement rather than pressure on the nerve. On the other hand, encapsulated adenomata which have undergone malignant degeneration are favourable for cure. He asks the question—What is the best treatment when the diagnosis of malignancy is almost certain, provided careful examination of the lungs is negative? He believes that a radical operation, although most formidable and exacting, should be attempted whenever it seems probable that all obvious disease can be removed. If malignant disease must be left behind, radium needles may be implanted and intensive X-ray treatment started, even on the afternoon of the same day. Porter rightly points out that cancer of the thyroid is not a very rare disease.

PLATE XLIX.

THYROIDECTOMY

(LAREY)



Showing superior pole ligated and cut, a small segment of gland being left (less than shown in the illustration). Double hooks applied and gland inverted. Posterior surface presenting hemostats applied, the points being plunged into the gland.

Kindly lent by 'Surgery, Gynecology, and Obstetrics'

Some statistics from Berne showed that there was one case of malignant tumour of the thyroid in every 93 post-mortems. In the Mayo Clinic, of 97 patients known to have malignant disease, there were 50 whose clinical history before the first operation contained no suggestion of malignancy. Malignant tumours of the thyroid are constantly missed: 23 which were passed by the pathologists without suspicion of malignancy, proved afterwards to be cases of undoubted cancer.

The Mayo Clinic *classification of goitre*, as pointed out by Bowen,³ is as follows: (1) Colloid and diffuse enlargement, which is identical with the so-called parenchymatous enlargement; (2) Adenoma—(a) without hyperthyroidism, (b) with hyperthyroidism (Plummer's disease); (3) True exophthalmic goitre; (4) Thyroiditis, simple and tuberculous; (5) Malignant thyroid.

Plummer's disease, i.e., the development of a toxicity in a simple adenoma, has not received sufficient recognition in this country. The signs and symptoms are unmistakable. The cardiovascular phenomena outweigh the nervous symptoms. [The disease has been referred to in detail in the MEDICAL ANNUALS of previous years.] Adenomatous thyroid with hyperthyroidism, and exophthalmic goitre, are two diseases as separate as typhus and typhoid fevers. The basal metabolism is never as high in adenoma with hyperthyroidism as in exophthalmic goitre. Cases of true exophthalmic goitre have weakness of the quadriceps muscle. If the patient is asked to step up on some high stool, he will cheerfully acquiesce and fail to fulfil his intention. This is a sign of distinction between the psychoneurotic patient and the true hyperthyroid case. The former can only with difficulty be persuaded to make the attempt, but steps up without the slightest trouble. Plummer lays stress on the increased appetite, the intolerance of heat, and the increased metabolic rate in true cases of hyperthyroidism.

Dr. Crile told the writer that he is sceptical of the value of basal metabolic investigation in thyroid disease, and has abandoned this method of examination as a routine. The clinical signs and symptoms are so easily interpreted that the basal metabolism can almost be accurately guessed.

The use of X rays in the United States is deprecated in cases of exophthalmic goitre: both physicians and surgeons appear agreed on this point. Iodine is not advised in cases of adenoma, save in small doses over a short period of time; otherwise hyperthyroidism may develop. In severe cases of hyperthyroidism, Crile ligatures both superior thyroid arteries, allowing an interval of three days to elapse between the tying of the two vessels. Thyroidectomy is performed after an interval of two or three months. There is a difference of opinion as to the reason for the beneficial effect of tying the superior thyroid artery. Crile thinks it is due to inclusion of the nerves in the ligature; in the Mayo Clinic the partial cutting off of the blood-supply is assumed to be responsible for the improvement.

Bowen concludes an interesting paper discussing a visit to the Mayo and Crile Clinics with a strong reference to the absolute necessity of proper team work if surgical operations are to be performed with any efficiency in the modern sense. He says: "Team work, an expression which has become so common on men's lips in this country in reference to certain crude efforts at organization, is seen carried out to plan in the greater American clinics. In both the Mayo and Crile clinics, when a surgeon comes to operate he always operates in the same theatre or group of theatres, and with the same assistants and accessories. Surgical skill combined with an almost perfect team system is what enables Dr. Crile to complete a thyroidectomy in fifteen minutes, not in a special show case, but in a series of cases. Is the time

likely to be improved upon? I doubt it. Dr. Crile at the Lakeside Hospital at Cleveland has three theatres, five assistants, and a highly-trained set of theatre nurses (*Fig. 17*). His patients are operated on in the same theatre, with the same instruments, the same assistants, the same nurses, the same gowns, towels, swabs, and gloves, whether they come from the almshouse round the corner or the home of the city magnate. In the best American medical centres the nursing home is part of the hospital. The splendid hospitals of the Mayo clinic are the ultimate evolution of the crude institution called a nursing home in this country”.

Mastin¹ discusses the *blood-supply of the thyroid gland*, and gives the following useful summary of his investigations: (1) The thyroid has a very rich arterial and venous blood-supply; (2) There is an extensive anastomosis not only

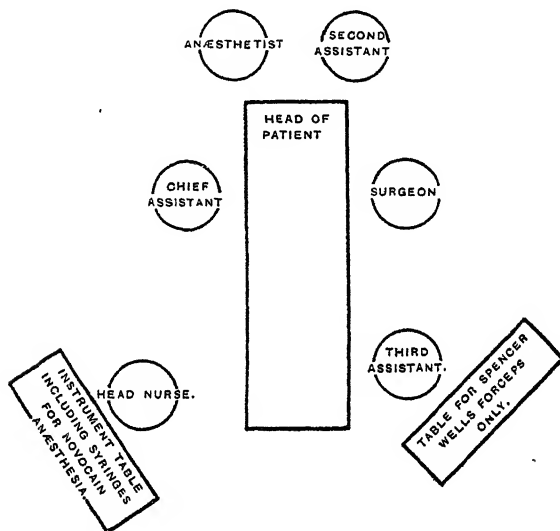


Fig. 87.—Diagram to show the position of the operating staff and the tables at the Crile Clinic.
(From the 'British Journal of Surgery'.)

between vessels of the same lobe, but also with those of the opposite lobe; (3) In the event of ligation of all four thyroid vessels the circulation can be re-established through extraglandular anastomosis; (4) The secretory activity of the thyroid gland is under nerve control; (5) After ligation of the superior thyroid artery a polar ligation should be made in order to cut off the veins, lymphatics, and remaining nerve filaments; (6) Control of hæmorrhage is best accomplished by interrupted mattress sutures placed through the remaining gland tissue, by ligation of all bleeding points, and by the use of gauze packing in the wound if necessary; (7) Bleeding veins can often be demonstrated by having the patient strain or cough before the wound is closed.

Mastin² has designed a *muscle clamp for thyroidectomies* (*Figs. 88, 89*) which, he says, is particularly serviceable in cases in which the sternohyoid and sternothyroid muscles are cut in the course of thyroidectomy. It has three important features: it does not crush or devitalize the muscle, it does not slip, and the downward curve of the handles prevents them from being in the way of the operator. The weight of the clamp is about that of a 6·5-inch Ochsner

clamp, and it is constructed so that there is $\frac{1}{8}$ in. separation between the jaws when they are closed. The pressure is sufficient to prevent bleeding from the cut edges, yet the muscle is not crushed. The upper jaw is corrugated and contains four pins $\frac{1}{4}$ in. long, which prevent the muscle from slipping. The lower jaw is smooth, and thus is easily slipped under the muscle; it contains four holes $\frac{1}{8}$ in. deep, which admit the four pins in the upper jaw.

Giordana and Caylor⁶ endeavour by histological study to find out the effect of ligation of the thyroid vessels in exophthalmic goitre, and thus to throw some light on the reason for the considerable improvement which temporarily follows this simple operation. They state that, when all four thyroid arteries are tied, collateral circulation is established from the carotids, from the arteries of the œsophagus and trachea, and even from the aorta. These workers are not quite certain whether or not involution changes noted following ligation of the vessels are attributable to the decrease in the blood-supply, or to the division of the sympathetic nerves accompanying these vessels.

Tinker⁷ writes an interesting paper on what he calls the 'desperate risk goitre'. He refers to the hyperthyroid cases with obstinate gastro-intestinal symptoms, with high blood-pressure and myocardial insufficiency. He says

the patients with nausea and vomiting or diarrhœa directly attributable to thyroid toxæmia, in spite of treatment, have died without exception. These cases are relatively rare, but, judging from Tinker's remarks, they are cases beyond the reach of operative help. High blood-pressure, he states, is almost a contra-indication to operation, unless the blood-pressure can be brought down in the first instance by medical treatment. The pressure often drops from 200 to 170 under proper management. In cases of myocardial insufficiency, the persistent use of digitalis is urged,

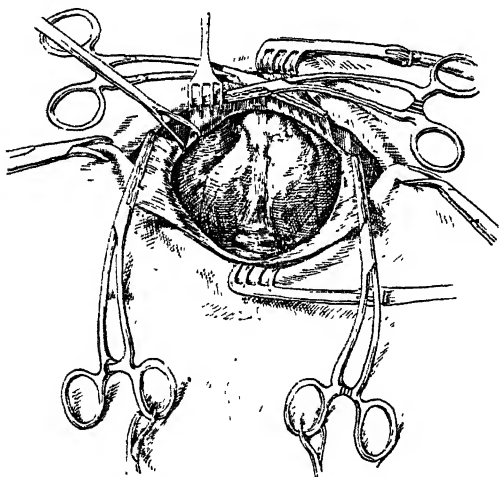


Fig. 89.—Mastin's clamp in position.

pushed regardless of dose until results have been obtained. It is stated that auricular fibrillation clears up in many cases, and such improvement sets in that many become good operative risks.

Other desperate risk cases are those which show extreme unrest, insomnia, emaciation, dyspnoea, œdema, and very rapid heart. Ligation is usually all

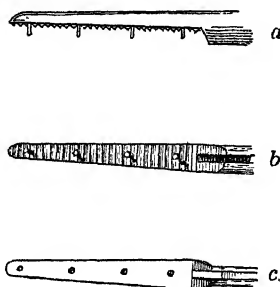


Fig. 88.—Mastin's muscle clamp for thyroidectomies: a, Upper jaw, side view; b, Upper jaw, front view; c, Lower jaw. (Figs. 88, 89, redrawn from 'Surgery, Gynecology, and Obstetrics'.)

that can be performed safely. Those who make good recoveries following ligation improve still further with a prolonged rest cure, and do well after incision.

The many-stage operation (stopping at any time that there is doubt whether the operation can be safely completed, and packing the wound with gauze) is not the ideal method, but it saves the lives of some patients who otherwise would not recover. Tinker deprecates the use of X rays, and states that no method but surgery has stood the test of time.

Six patients are mentioned as having choked to death without even consulting a surgeon. Most of the obstructed goitres are more or less intrathoracic. Local anaesthesia is urged in such cases. Fortunately the vessels find their main trunk in the neck, and even deeply located growths can be dragged up and out without tearing the vessels.

Even a small or transient presentment of sugar in the urine and blood puts many hyperthyroid cases in the desperate risk class. [It will be interesting to observe the effect of insulin in decreasing operative risk in bad surgical cases. In one case recently, severe cellulitis of the hand and arm was followed by diabetic coma and death after operation. Insulin was used as part of the treatment.—W. I. de C. W.]

When malignancy of the thyroid is present, the results of operation, even in well-established cases, are not—according to this writer—as hopeless as is generally thought. Most of the cases were treated post-operatively with radium or X rays. Patients well after eight and ten years are referred to.

Else and Irvine⁸ refer to the *causes of surgical failure in hyperthyroidism*. There may be errors in diagnosis. Some cases, on cursory examination, with tachycardia and tremors, may be mistaken for hyperthyroid cases, but they are frequently under-nourished and have a poor appetite. Often the real cause is attributable to chronic infected tonsils or incipient tuberculosis, or perhaps pelvic trouble. The basal metabolic rate is normal in such cases.

Over-estimation of the patient's resistance may lead to surgical failure. In this connection, it is pointed out that exophthalmic goitre is a disease that occurs in cycles, each cycle consisting of four stages: (1) The stage of development; (2) The stage of maximum intensity; (3) The stage of retrogression; (4) The stage of remission. A radical operation should not be performed in the second stage; patients do well when operation is performed in the third stage; in the fourth stage, apart from unseen complications, operation is safe.

There may be persistent symptoms in cases where the operation is unduly delayed. Insufficient operation is often a cause of failure. Simple ligation does four things: (1) Shuts off the arterial supply; (2) Prevents the return of venous blood; (3) Stops impulses coming through the nerve; (4) Blocks the lymphatics. Ligation of the inferior thyroid artery should never be performed, because of the danger of tetany. After ligation of the superior poles, the improvement in the patient's condition should be followed by the major operation: otherwise free collateral circulation is set up, symptoms recur, and the operation is more difficult and dangerous. Single lobectomy is often not sufficient. The after-treatment is most important.

Haggard and Dunklin,⁹ referring to the after-treatment, state that the hardest thing to learn is not to do too much. A most excellent rule, therefore, is to stop the operation at any moment at which any fear is entertained as to the outcome. Very mortifying experiences will be avoided if this simple precaution is taken. It is not because we do not know of the danger that we are in, but because we think we can get by. When in doubt, stop. The temporary packing open of the wound with gauze, as advocated by Crile, is really a life-saving measure in those desperate cases where the prolongation may be the last

or fatal straw. The wound can be easily and quickly closed the same day, and if necessary the next day, without any difficulty and with as little scar as one could desire.

The after-treatment in these cases is a question of months instead of weeks, and years instead of months. The mere removal of the cause of the poisoning does not repair the damage done to the vital organs and functions. He is the best surgeon who avails himself of the best medical care and physiological management in the after-management of these grave cases.

In the technique, one should always bear in mind that it is only essential to leave a small portion of the exophthalmic gland, but that portion should always be over the trachea along the posterior capsule. Furthermore, in the closure of a wide defect after bilateral resection, one could easily draw up

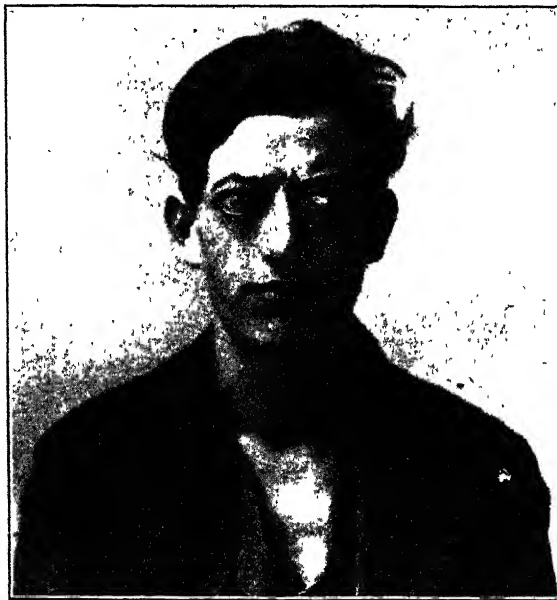


Fig 90.—Toxic goitre commencing with exophthalmos, no other signs present.

the tissues too tightly, so that the larynx is interfered with; in one such case the patient was only rescued from the impending suffocation by a tracheotomy on the table. This is bad surgery, and could be avoided by proper care. Large lateral lobes and substernal goitres should not be rudely rolled out on the neck, as they may quickly cause cyanosis. It is rather better to sever the gland at the isthmus, as advocated by Balfour, and then to separate it from its superior attachment and pull it up, as advised by Crile. To push it up takes the chance of rupturing delicate blood-vessels and deluging the field with blood.

Rogers¹⁰ states, *inter alia*, that simple hypertrophy of the thyroid, common in growing children and adolescents, does not always subside with the administration of iodine. Indeed, too much, or too frequently administered doses, may be followed by increased hypertrophy or by the development of adenomatous

or cystic changes. The iodine content of the normal human thyroid is about 0.5 mgrm. per gramme of fresh gland substance. The hyperthyroid gland seems unable to hold this amount, and the severity of the symptoms is more or less proportionate to the thyroid's lack of iodine. Feeding this element generally increases the disturbance, though it may prove inert or temporarily beneficial. Rarely a very small amount of iodine, especially if combined with adrenal feeding, may prove curative.

Fig. 90 illustrates a case at present under treatment in Mercer's Hospital, Dublin. Exophthalmos was well marked, and was the only symptom of hyperthyroidism. Exophthalmos is, as a rule, accompanied by other signs of hyperthyroidism and is associated with active disease, or may remain when other symptoms have disappeared as the result of active treatment; but it is very unusual to find exophthalmos occurring suddenly in the absence of other signs. In the case illustrated the eyes became prominent suddenly without the knowledge of the patient. His attention was called to the condition by the neighbours. The photograph does not do justice to the extent of the protrusion. The pulse-rate was 70, there was no tremor, the patient was calm and collected, he had not lost weight, there was no weakness of the quadriceps muscle, sweating and other signs were also absent. The basal metabolic rate could not be ascertained. There was no enlargement of the thyroid gland, but large vessels stood out, and a murmur could be heard over the veins. A normal-sized lobe was removed by operation. The veins and arteries were greatly enlarged, and the gland was much more vascular than is usually seen even in well-marked cases of hyperthyroidism. Sections of the portion removed demonstrated well-marked Graves' disease. The exophthalmos had been present for eleven months.

REFERENCES.—¹*Surg. Gynecol. and Obst.* 1923, June, 825; ²*Ibid.* 621; ³*Brit. Jour. Surg.* 1923, Jan., 359; ⁴*Surg. Gynecol. and Obst.* 1923, Jan., 69; ⁵*Ibid.* 1922, Nov., 644; ⁶*Ibid.* 1923, Jan., 75; ⁷*Jour. Amer. Med. Assoc.* 1922, Oct. 14, 1291; ⁸*Ibid.* 289; ⁹*Surg. Gynecol. and Obst.* 1922, Nov., 553; ¹⁰*Amer. Jour. Med. Sci.* 1923, Jan., 66.

TONSILS, DISEASES OF.

A. J. M. Wright, M.B., F.R.C.S.

Enlarged Glands of the Neck in Relation to Tonsillar Disease.—Some degree of enlargement of the cervical glands is present in the majority of cases of enlarged tonsils in children. The fact that these glands usually subside after removal of the tonsils indicates that the infection is, in the majority of cases, a simple inflammatory and not a tuberculous one. Howarth¹ investigated this question by making a series of pathological examinations of the tonsils removed from children with enlarged glands in the neck. In all the cases examined, consisting of children between the ages of 2 and 15, infection was present in the tonsils. The streptococcus was the pathogenic organism most frequently found, the tubercle bacillus being only present in 5 per cent. He concludes that tuberculosis is probably a late infection, and that in the majority of cases the enlarged glands are due to a septic absorption, with the tuberculosis as a secondary infection.

Tonsillectomy in Contagious Diseases.—The tonsils are probably the main site of infection in scarlet fever and diphtheria. Place² has observed, as one might expect, that the throat lesions in scarlet fever in individuals who have had their tonsils removed are mild in type. Similarly, severe faucial diphtheria is rare after the tonsils have been removed. As a result of these observations, he has removed the tonsils from some hundreds of cases during an attack of these diseases. He found that while the operative dangers do not seem to be any greater, the removal of tonsils and adenoids shortens the period of contagiousness of scarlet fever and diphtheria, and, in the case of the former disease, seems to reduce the risk of complications. While this recommendation

of operation in the acute stages seems somewhat heroic, there is no doubt that, in a proportion of diphtheria carrier cases, the tonsils harbour the organisms, and excision of the tonsils is necessary to remove infection.

After-results of Tonsil Operations in Focal Infections.—Removal of the tonsils is advocated for a large variety of systemic diseases. Pentecost³ has re-examined 800 cases operated on for this purpose at intervals of from six months to one year after operation. He concludes that, as far as the operation is concerned, operative and post-operative results seem to indicate a causal connection in the case of rheumatism, myalgia, neuritis, cervical adenitis, chronic catarrhal deafness, general debility, neurasthenia, migraine, and recurrent colds. In the case of chronic bronchitis, asthma, nephritis, and endocarditis, the general health was improved, but no direct effect on the disease could be traced. In the case of osteo-arthritis and epilepsy no improvement resulted.

Whitton⁴ has investigated a small series of cases from the point of view of the effect of removal of the tonsils in *chorea*, *epilepsy*, *goitre*, and *rheumatism*. Of 11 cases of chorea, 2 recovered immediately following the removal of tonsils and adenoids, in 1 the condition persisted for two years, and in the 8 other cases it still persists. Of the 6 cases of epilepsy, 4 are now free from fits, and the other 2 improved; five of the cases were children under 12 years, and the sixth, an adult, was one of the two cases improved. Of the 15 cases of goitre, 7 were simple and 8 exophthalmic; all were women. Of the simple cases, in 1 the goitre disappeared, in 2 it diminished in size, and 4 were unaltered. Of the 8 exophthalmic cases, 2 are well, 2 improved, and in 4 there is no change. He concludes that tonsillectomy is sometimes useful in the toxic variety of exophthalmic goitre. All varieties of rheumatism were represented—acute, chronic, muscular, and rheumatoid arthritis. Of the 23 cases, 14 are now free from rheumatism, 3 are improved, and 6 unaltered. Of the 14 cases now recovered, 7 had had one or more attacks of acute rheumatism, while the other 7 were chronic articular cases. In 3 of the latter, the joints cleared up within a month of the tonsillectomy. Of the 6 unimproved cases, 2 were examples of rheumatoid arthritis with bony changes, while the other 4 were cases of chronic rheumatism, 2 of them muscular. Thus, the removal of tonsils and adenoids, if present, seems to be helpful in the case of epilepsy in children, in some cases of exophthalmic goitre, and in the majority of cases of acute and chronic rheumatism.

Post-operative Complications.—

Pulmonary Abscess.—Reference to this complication of operations on the nose and throat, chiefly tonsillectomy, was made in the MEDICAL ANNUAL, 1923, p. 471. Further attention has been drawn to this, and other cases have been published. It seems practically certain that the abscess is due to the aspiration of septic material, as shown by its affecting the right lung near the hilus in the very great majority of cases. Chipman⁵ gives the following precautions to obviate this: the operation should not be performed in the presence of acute tonsillitis or any acute febrile condition. The patient should be adequately prepared for the operation, and cleanliness of the mouth ensured. Anaesthesia should be light, with preservation of the cough reflex and the hanging-head position, preferably with a suction apparatus to remove blood. Bleeding points should be controlled by ligature. Moore,⁶ in addition to similar precautions, advises against the use of morphia as a preliminary injection, and insists on the importance of the patient being prone on the side after operation.

X Rays and Diathermy Treatment.—X-ray treatment as an alternative to operation was referred to in the MEDICAL ANNUAL, 1923, p. 472, and it was

then remarked that some considerable time must elapse before judgement can be passed on the matter. Some research has been conducted during the year by various observers. Babcock⁷ has observed a series of cases from a clinical, pathological, and bacteriological standpoint. He concludes that while X Rays may cause some diminution in the size of tonsillar or other lymphoid tissue, the residue may not infrequently be observed to be acutely inflamed. Also the small fibrous tonsil produced by this treatment is the most frequent variety to serve as a focus of infection. Tonsils which have been treated and later examined are found not to be free from pathogenic bacteria. On microscopic examination, the alleged widening of the crypts and increase in connective tissue was not observed. The effect on adenoids is unappreciable. General symptoms involving heart and joints are not relieved by the treatment. He concludes that until it is more definitely shown that diseased tonsils can be as efficiently removed by X rays as by surgery, the latter is better employed. Nuzum⁸ found that X rays caused some reduction of the size of the tonsils in only 15 per cent of cases, while hæmolytic streptococci were still present in 50 per cent of the tonsils after treatment. Bordon,⁹ in a series of 16 cases in which the tonsils were first X-rayed and later excised, failed to find any clinical or pathological changes as a result of radiation. Lederer¹⁰ reports similar results.

The absence of bleeding at the time of operation might seem to be a powerful argument in favour of the employment of **Diathermy** for the removal of tonsils. Novak,¹¹ as a result of experience in several cases, comes to the conclusion that although the operation is simple and bloodless, it is to be condemned for the following reasons: There is severe post-operative reaction, pain, and toxæmia. There is no accurate method of determining dosage, nor of confining destruction to the tonsillar tissues. If the whole tonsil is destroyed, some damage to surrounding parts must follow.

Bone and Cartilage in the Tonsil.—The presence of bone or cartilage in the tonsil, while not infrequent pathologically, may occasionally give rise to clinical

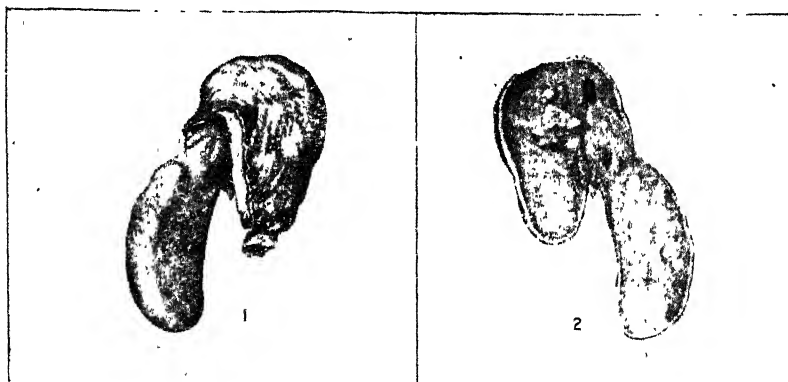


Fig. 91.—An uncommon tonsillar appendage and its relationship to cartilage formation in the tonsil (A. Logan Turner and Thomas Sprunt). (By kind permission of the 'Journal of Laryngology and Otology'.)

symptoms. Portmann¹² has examined histologically a large number of tonsils both healthy and diseased. He finds that the occurrence of small islets of cartilage in the connective tissue of the tonsil occurs in 16 per cent of cases,

and that this frequency is the same in the case of healthy or diseased tonsils. These islets are probably of embryological origin, and may undergo ossification.

Logan Turner¹³ reports a case in which a large finger-like process was present attached to the lower pole of the left tonsil in an adult (*Fig. 91*). The process consisted of a central core of connective tissue, with detached cartilaginous nodules embedded in it. The process was removed with the tonsil. He maintains that the embryological origin of these cartilage formations is shown by the fact that they may be present in the tonsils of stillborn children, and that they are confined to the connective tissue which precedes the lymphoid tissue in the development of the tonsil. Tilley¹⁴ reports an unusual case in which a large compact osteoma was removed from the left tonsil of a female, age 30 (*Fig. 92*). A swelling had been present since childhood, and the chief symptom was pain at the base of the tongue caused by its rubbing against the projection. Examination showed a swelling, the size of a walnut, in the left tonsillar region, covered with smooth normal mucous membrane except for an area the size of a threepenny-bit, which was blue-grey in colour and felt like bare cartilage. The bony mass was enucleated without difficulty.

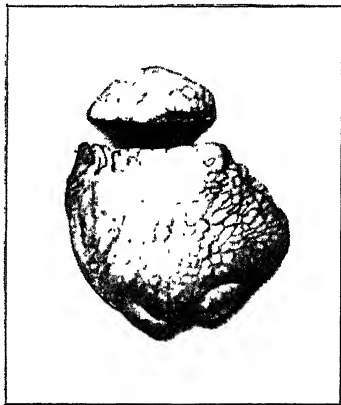


Fig. 92.—Osteoma of tonsil. (By kind permission of the *Journal of Laryngology and Otology*.)

Styloid Process in the Tonsil.—This condition was briefly referred to in the *MEDICAL ANNUAL* for 1920, p. 353. The condition consists in an unusual elongation of the styloid process, which projects into the tonsil and may even form a projection in the lateral wall of the pharynx. A. J. M. Wright¹⁵ reports two such cases which may be regarded as typical, and it is probable that they are more frequent than is recognized. Clinically, the cases are of the following type: The period during which symptoms have been noticed varies from a fortnight to ten years, with an average of three years. In all, the symptoms are very similar, consisting of discomfort and dragging sensation in one side of the throat, most marked on swallowing, and sometimes on talking. In some of the cases there was a history of previous attacks of tonsillitis. Injury as a possible factor was present in one case. Of 10 collected cases, 9 were submitted to operation, with relief of symptoms in every instance. In some of the cases the tonsil was removed in addition to the portion of the styloid process, but the results seem to have been equally good where this was not done. Palpation with the finger will usually suggest the diagnosis, and it is worth while carrying out such palpation when these symptoms are complained of.

REFERENCES.—¹*Lancet*, 1923, i, 1202; ²*Boston Med. and Surg. Jour.* 1922, Sept. 21, 434; ³*Canad. Med. Assoc. Jour.* 1922, Dec., 886; ⁴*Jour. of Laryngol. and Otol.* 1922, Nov., 552; ⁵*Jour. Amer. Med. Assoc.* 1922, Aug. 12, 539; ⁶*Laryngoscope*, 1922, Sept., 686; ⁷*Jour. Amer. Med. Assoc.* 1923, Feb. 3, 300; ⁸*California State Jour. of Med.* 1922, July, 237; ⁹*Boston Med. and Surg. Jour.* 1923, April 5, 493; ¹⁰*Jour. Amer. Med. Assoc.* 1922, Sept. 30, 1130; ¹¹*Ibid.* 1923, June 23, 1842; ¹²*Rev. de Laryngol., Otol., et Rhinol.* 1923, July 15, 543; ¹³*Jour. of Laryngol. and Otol.* 1923, April, 179; ¹⁴*Ibid.* 1922, Sept., 473; ¹⁵*Brit. Med. Jour.* 1923, ii, 282.

TORTICOLLIS, SPASMODIC.

Sir James Purves-Stewart, K.C.M.G., C.B., F.R.C.P.

A quarter of a century ago the subject of spasmodic wry-neck was discussed with energy by numerous neurologists. At that period almost every clinical syndrome which could not be placed within one or other of the classic categories of organic lesion, every nervous malady for which no focus of disease could be detected, whether by the naked eye or by the histopathological methods then available, was put down as a neurosis¹. To that period belong the works of Brissaud and Meige, who attributed a great number of their cases of wry-neck to some mental disorder or other. Modern observers attach much less importance nowadays to the mental element, and of late two different theories have been discussed. One is that of Marie and Léri,¹ who in 1920 directed attention to certain lesions of the cervical vertebræ, detected by radiography. These lesions consisted in irregularities of the 5th and 6th cervical vertebræ, probably of rheumatic origin. Vertebral lesions of this sort occurred so frequently that they suggested a peripheral source of irritation inducing a reflex spasmodic torticollis, by irritation of the cervical roots at the intervertebral foramina.

More recently, Babinski, in 1922,² bearing in mind various recent observations on the subcortical reflex centres, more especially those in the mid-brain, suggested that spasmodic torticollis is due to an irritative lesion of these centres.

More recently still, Roger and Pourtal³ have published a series of eight cases in which they made observations from both points of view. Seven of their cases showed radiographic evidences of osseous lesions of the cervical vertebræ; moreover they were tender on pressure and had creaking on active or passive movement. On the other hand, five of their patients had signs of organic lesion either of the pyramidal tract or, more frequently, of the extrapyramidal system corresponding to the side of their torticollis. Bearing in mind the well-known unilaterality of the symptoms of spasmodic torticollis, they suggest that the osseous changes in the vertebræ may really be secondary to the incessant cervical spasm, which probably has its origin in the uncontrolled activity of the mid-brain centres, especially in the contralateral corpus striatum.

REFERENCES.—¹*Soc. méd. Hôp. de Paris*, 1920, March 12; ²*Soc. de Neurol. de Paris*, 1922, March 8; ³*Presse méd.* 1922, Sept. 13, 785.

TRACHEA, DISEASES OF.

A. J. M. Wright, M.B., F.R.C.S.

Spontaneous Rupture.—These cases are rare. Zench¹ gives an account of 52 from the literature and one of his own. In the latter case, a boy of 7 struck his neck against the pedal on a tricycle over which he stumbled. Immediately after the accident an emphysematous swelling appeared in the neck and rapidly extended over the thorax and abdomen, together with increasing cyanosis and dyspnœa. No external injury or hæmorrhage occurred. Multiple incisions diminished the swelling and improved the breathing. The trachea was exposed under a general anæsthetic and showed an almost complete transverse rent between the second and third rings. This was sewn up with catgut and the external wound closed. Recovery was uneventful. In recorded cases, the tracheal damage seems to be out of proportion to the force producing it. Half of the reported cases died. The best results are obtained by early diagnosis and radical treatment, as was employed in this case.

REFERENCE.—¹*Illinois Med. Jour.* 1922, xli, 451.

TRACHEOTOMY. (See LARYNX, DISEASES OF.)

TRICHINIASIS.*Robert Hutchison, M.D., F.R.C.P.*

Minor outbreaks of trichiniasis have been reported lately in America,¹ in Wales,² and in Germany.³ In all the symptoms were much the same, and are thus described in the Welsh cases:—

"In all the adult cases there was some gastro-intestinal disturbance, with pain in the epigastric region. Vomiting occurred in all but four cases; diarrhoea was a marked symptom in seven; headache with œdema of the eyelids and conjunctivæ were present in all cases. The conjunctiva over the outer half of the eyeball was red and œdematous, the eyelids were also œdematous and in some cases completely closed. (The appearance of the face in one of the German cases is shown in *Fig. 93.*) There was no purulent discharge. Temperature about 102°, remaining in this neighbourhood for about eight days—in three cases for fourteen days. The pulse-rate was not at first raised in proportion, but after a week it became rapid on the slightest exertion. The tongue was greyish but clean; later it became red and dry. All adult cases complained of intense muscular pain. The chief muscles involved were those at the back of the neck, arm, and calves. Flexion of the head was painful. There was marked tenderness in the muscles of the calves when moved or squeezed. In some cases the knees were flexed, in others extended; in all cases there was intense pain on any change of position. Two patients complained of pain in the calves on walking down stairs; four had tender spots on the calf muscles, with localized swellings; two complained of a tender spot in the lower end of the biceps humeri, and one had well-marked œdema of the right forearm. In three cases there were well-marked swellings just above and below the zygoma on each side. Knee-jerks were present in all but one case; respiration was quiet and shallow. One patient on the

fourteenth day complained of great pain and discomfort in the chest, and supported his chest by pressing his hands over the lower ribs. Dyspnœa on the slightest movement was a marked symptom in all the severer cases. In no case was there any involvement of the lungs. There was no skin eruption, except in one case, which on the seventh day of illness developed an abundant rash on the abdomen, similar to that seen in paratyphoid. Sweating was profuse in all cases. Insomnia was a distressing symptom in most cases, and in two there was wild delirium for five successive nights. The abdomen was a little distended and somewhat resistant. The spleen was not enlarged; there was no albuminuria. Prostration was a marked symptom in all 13 patients; anæmia and great wasting took place in the severest cases. The blood-count showed a marked eosinophilia in all cases. Recovery was fairly rapid; most of the cases were up in fourteen days, but three were still in bed at the end of the fourth week."



Fig. 93.—Facies in trichiniasis.

On the fourteenth day complained of great pain and discomfort in the chest, and supported his chest by pressing his hands over the lower ribs. Dyspnœa on the slightest movement was a marked symptom in all the severer cases. In no case was there any involvement of the lungs. There was no skin eruption, except in one case, which on the seventh day of illness developed an abundant rash on the abdomen, similar to that seen in paratyphoid. Sweating was profuse in all cases. Insomnia was a distressing symptom in most cases, and in two there was wild delirium for five successive nights. The abdomen was a little distended and somewhat resistant. The spleen was not enlarged; there was no albuminuria. Prostration was a marked symptom in all 13 patients; anæmia and great wasting took place in the severest cases. The blood-count showed a marked eosinophilia in all cases. Recovery was fairly rapid; most of the cases were up in fourteen days, but three were still in bed at the end of the fourth week."

In all the cases there was a high degree of eosinophilia (15 to 40 per cent), with a variable increase in the total leucocytes. In the American outbreak

even higher degrees of eosinophilia were found, and high counts were also found in the blood of individuals who had partaken of trichinous pork but yet showed no clinical symptoms of the disease.

TREATMENT is still only preventive, and consists in the thorough cooking of pork. In an attack one can only treat symptoms, but if the patient is seen soon after eating the suspected meat it may be possible to abort the disease by Washing out the Stomach, and by giving Thymol (2 gr. four or five times in the first twenty-four hours, followed by a purge).

REFERENCES.—¹*Amer. Jour. Med. Sci.* 1923, April, 567; ²*Lancet*, 1922, ii, 799; ³*Munch. med. Woch.* 1922, Sept. 18, 1336.

TRYPANOSOMIASIS.

Sir Leonard Rogers, M.D., F.R.C.P., F.R.S.

EPIDEMIOLOGY.—H. L. Duke¹ and C. F. M. Swynnerton² deal fully with an interesting recent outbreak of the severe *rhodesiense* form of sleeping sickness near Mwanza, in Tanganyika Territory. They agree in attributing an important rôle to a great decrease of game driving the fly to attack man, in direct opposition to Bruce's contention that African game should be destroyed to prevent man being infected with the *T. brucei* of animals; but they differ regarding the mode of development of the outbreak, Duke holding that owing to the vitality of the people being undermined by famine and ankylostomiasis the local game *T. brucei* obtained a footing in man, while Swynnerton thinks the disease was introduced from without the area by human agency due to the movement of Belgian troops during the war. The disease is characterized by numerous trypanosomes in the peripheral blood, and the rapid development of symptoms, including enlargement of the axillary glands. The writers agree that infection is always traceable to contact with a previous case through visits, etc., and is often a hut infection, and Duke considers that direct transmission by the tsetse-flies on account of the numerous trypanosomes in the patient's blood is far more important than cyclical transmission after development in the flies, so that "the main danger to be avoided is the presence of infected natives in communities exposed to the tsetse; and that the game, far from being a menace, serves as a valuable buffer between man and the fly". Swynnerton found a new tsetse-fly, called after him by Austin, and belonging to the *morsitans* group, to be the only carrier, and that they will follow natives for at least a mile and a quarter or fly over seventy yards of open space; so that extensive clearings of forest are necessary to afford protection from the flies, most cases occurring along the margins of populated areas in contact with forest, continuous density of fly in relation to man in the absence of game being the essential cause of the spread of the disease.

TREATMENT.—Important work has been published regarding several methods of treatment of sleeping sickness during the past year. C. H. Marshall and S. M. Vassallo³ give further results of their treatment by intrathecal injections of the Patients' Salvarsanized Serum, based on nearly 100 cases under observation for a year and a half, and another 200 for six to seven months, which confirm the much-criticized claims of their former papers. Their mortality has been between a minimum of 14·7 and a maximum of 70 per cent, according to whether untraced cases were assumed to be alive or dead, while in a Gulu District series of cases only 28 per cent had died after fifteen months, although the mortality of untreated cases was 61 per cent; they give a table of 32 cases which were followed up for considerable periods, of whom 26 remained well, and another showing the results of various other methods of treatment, indicating, in substantiation of their claim, that their method has given better results than any other, while it has the great advantage of only requiring the detention of the patients for a very few days for treatment.

C. C. Chesterman⁴ reports on 40 cases of sleeping sickness treated in the Belgian Congo with Tryparsamide, which is a sodium salt of n-phenylglycine-amide-parsonic acid, first prepared by Jacobs and Heidelberger, of the Rockefeller Institute for Medical Research, and found by W. H. Brown and Louise Pearce to be very active against both animal and human trypanosomes, the latter having shown in the Congo that it produced both sterilization of the peripheral blood and diminished cell-content of the cerebrospinal fluid at the same time that great clinical improvement took place. After performing lumbar puncture and doing a cell-count, eight weekly injections of 3-grm. doses in 10 c.c. were made intravenously, and some weeks later a fresh cerebrospinal cell-count was performed. Tables are given of 24 previously untreated cases, 10 with various earlier treatment, and 6 treated with Marshall and Vassallo's intrathecal serum method without benefit. The doses had to be modified in some cases showing visual affection; but the results show remarkable clinical improvement, accompanied by great diminution of the cerebrospinal cell-count, often to a normal figure, even in the most advanced cases, which has so far been maintained for periods not exceeding eleven months, so that if the effects prove lasting this new drug appears likely to be of great value.

Further reports on a few cases treated by the secret German remedy, 'Bayer 205', have appeared during the past year. J. W. W. Stephens and W. Yorke⁵ record one patient treated in Liverpool by three injections of 0.5, 1, and 1.5 gm. on alternate days, and 1 gm. twenty-four days later, who recovered and has remained well for six months, while a case treated by Yorke in July, 1921, was all right sixteen months after treatment. G. C. Low and P. Manson-Bahr⁶ record 8 cases of *T. gambiense* and 1 of *T. rhodesiense* treated by the same method, with 2 deaths and 7 recoveries, all European cases, and although the cases have not been followed up long enough to see if the results will be permanent, they conclude that the drug is the most powerful trypanosomicidal substance yet discovered, although not an infallible one. They advise 1-grm. doses intravenously in a 10 per cent solution, although 2 gm. have been safely given once a week up to ten doses. It produces albuminuria with casts in the urine, but this appears to be transitory, though in two cases the casts have persisted for over a year; but the amount of urine, the urea content, and the blood-pressure remain normal, and also the fundus oculi. W. Menk⁷ also records a successful case.

REFERENCES.—¹*Proc. Roy. Soc. (Ser. B.)*, 1923, Jan. 4, 250; ²*Bull. Entom. Res.* 1923, Jan., 317; ³*Brit. Med. Jour.* 1923, i, 231; ⁴*Trans. Roy. Soc. Trop. Med. and Hygiene*, 1923, Jan., 394; ⁵*Ann. Trop. Med. and Parasitol.* 1922, Dec. 30, 421; ⁶*Brit. Med. Jour.* 1922, ii, 1265; ⁷*Munch. med. Woch.* 1923, Jan. 5, 18.

TUBERCULOSIS OF GENITO-URINARY TRACT. (See BLADDER, DISEASES OF.)

TUBERCULOSIS OF JOINTS. (See BONE AND JOINT SURGERY.)

TUBERCULOSIS OF THE LARYNX. (See LARYNX, DISEASES OF.)

TUBERCULOSIS AND ITS PREVENTION.

Joseph Priestley, B.A., M.D., D.P.H.

A New Form of Preparation of Tuberculin.—The feature of the past year is, undoubtedly, the discoveries of Dr. Georges Dreyer, of Oxford University. The groundwork of the discoveries is the fact that the coating or case of the tubercle bacillus can now be dissolved and its protected influence, thereby, be destroyed. The old Latin adage is necessary—*festina lente*; otherwise, false hopes may be raised in the breasts of thousands and thousands of sufferers from tuberculosis.

The principle of the discoveries, viz., the 'defatting' of the tubercle bacilli by formalin, etc., is certainly new. The coating of fat is a sort of protective coat, which enables the tubercle bacillus to live in its host without fear of damage to itself. Once the fat coating is removed, the germ is open to attack. 'Defatted' microbes, injected into a patient, give rise to a maximum production of such patient's antibodies (antituberculosis bodies), which, in their turn, attack the tubercle bacilli that may be causing tuberculosis in any parts of the patient's body. The newness of the discovery of Dr. G. Dreyer consists in treating the culture of tubercle bacilli (to be used for injection purposes) with formalin, etc., thereby rendering the 'defatting' process easy—the suggestion of 'defatting' belonging to Captain Douglas, who, however, had difficulty in effecting the fat removal, and did not discover the value of formalin, etc., for that purpose as Dr. G. Dreyer did.

Lax Notification in Tuberculosis Cases.—Attention has been called by the Ministry of Health by circular letter (No. 425) to the failure of some medical practitioners to notify cases of tuberculosis—as much as 40 per cent—and the Minister has communicated direct with every practitioner in England and Wales on the subject. Compulsory notification of tuberculosis by medical practitioners is rendered necessary by the Public Health (Tuberculosis) Regulations 1912, and the notification must be made within forty-eight hours of the medical practitioner becoming aware, for the first time, that any of his patients is suffering from tuberculosis. The notification is to be sent to the medical officer of health of the district in which the patient is residing. There is, unfortunately, a proviso to the effect that notification is not necessary if the medical practitioner has reasonable grounds for believing that the case has already been notified to the medical officer of health. This proviso has been the cause of much of the laxity in notifying. There is, of course, no obligation to notify *suspected* or *doubtful* cases. All notifications are strictly private and confidential to the medical officers of health, and official visiting is dispensed with, where the notifying medical practitioners so desire.

The importance of early notification is admitted, but so also is the difficulty in diagnosing early cases. There is nothing more difficult in medicine than diagnosing with certainty pulmonary tuberculosis, for instance, in its very early stages, and that, too, despite modern diagnostic methods, e.g., X rays, tuberculin reactions, and bacteriological examinations of blood.

The tendency is for the medical practitioner to wait until the diagnosis is confirmed by a *positive* result from sputum examination. This makes the diagnosis absolutely certain, but it also means that the disease is advanced beyond the early stage, as the tubercle bacillus only escapes from its encysted stage when the lung tissue begins to break down, practically the second or third stages of the disease.

Everything, therefore, is against *early* notifications being received officially; but it is hoped that the various tuberculosis dispensaries schemes, with skilled tuberculosis officers for consultation purposes and advice, will prove of value, in the future, in enabling earlier notifications to be made, thereby helping the patients themselves by early treatment as well as the patients' 'contacts' by preventive measures. The medical practitioner, the medical officer of health, and the tuberculosis officer must work together in unison and full co-operation, if the best results are to be achieved in prevention and treatment.

Bovine versus Human Tuberculosis.—The National Milk Conference, 1922, focused attention upon the important subject of bovine tuberculosis in relation to man, and the results may be tabulated up to date in the words of Dr. A. S. Griffith, research bacteriologist to the Medical Research Council, as follows: Bovine tuberculosis is an important source of human tuberculosis in Great

Britain, especially in childhood, sharing in the production of all the chief clinical varieties of human tuberculosis (with appreciable loss of life). The age-incidence (children under 5 years of age) and the anatomical distribution of the primary lesions point to cow's milk as the source of the infection with bovine tubercle bacilli. The remedy is simple, viz., prohibit the use of milking cows that show tuberculous udders or are found to be suffering from tuberculosis of any other organs, such cows being capable of yielding infective milk, infected in its passage through the udders or indirectly by infected faeces or infected uterine discharges. The bovine tubercle bacillus is not less virulent for man than the human tubercle bacillus, and there is no clinical distinction between bovine and human surgical tuberculosis, i.e., surgical tuberculosis caused by the bovine and the human tubercle bacilli respectively.

Official Disinfection and Tuberculosis.—Systematic official disinfection will have to be the rule, in future, after tuberculosis. The High Court has laid down that a furnished house, previously occupied for a comparatively short time (few weeks) by a tenant suffering from pulmonary tuberculosis, and let to another tenant without cleansing and official disinfection having been carried out before the second tenant took up tenancy, is *quâ* tuberculosis-infection and non-disinfection unfit for human habitation, being a danger to health. The second tenant was, therefore, held to be justified in breaking the lease, and was also awarded damages. The routine practices of sanitary authorities in regard to official disinfection after tuberculosis will require tightening up and bringing into line with this case-law decision.

In a sense, Mr. Justice McCardie's judgement has an interesting medico-legal aspect, in that it is laid down that a furnished house, wherein a pulmonary tuberculous patient has been living (for as short a period as six weeks), is not reasonably fit for human habitation. It is to be noted that the judgement had reference to a furnished house, no warranty of fitness being implied in the letting of an unfurnished house (except a working-class dwelling). The judgement brands the tubercle bacillus as a real danger to health, more dangerous than is fully realized. One person in seven dies from it, the result of (a) direct or personal infection, and (b) indirect infection through dust, wall-papers, carpets, rugs, curtains, bedding, etc. Mr. Justice McCardie gave as his opinion that the infection of tuberculosis can be destroyed in a few days, or even hours, by open exposure to the direct rays of the sun (exposure to the light and air of an ordinary room not being sufficient), whilst several antiseptics (the judge meant, of course, germicides or true disinfectants) are fatal to it. Sputum, if allowed to dry when infected with the tubercle bacillus, may preserve its virulence and capacity for six months.

There was an interval of six weeks between the departure from the house of the tuberculosis patient and the arrival of the new occupier, but, in evidence, the house was stated to be dusty and dirty. The tuberculosis patient had not been officially notified to the medical officer of health by, nor had any cleansing or disinfection been carried out under the supervision of, the medical attendant, after the infected patient had left the house.

Some more Shibboleths connected with Pulmonary Tuberculosis.—Dr. Bernard Hudson, of Montana Sanatorium (Switzerland), has recently added to the shibboleths connected with pulmonary tuberculosis and collected by Dr. Marcus Paterson, and these may be set out for reference as follows: (1) You are not ill enough to go to Switzerland; (2) You should be cured in the place where you are going to live; (3) You must not go to an altitude because you have been spitting blood; (4) The blood comes from the back of the throat; (5) You can be cured just as well on a London balcony as in Switzerland; (6) You must not go to an altitude because you have a weak heart.

These sayings (common and parrot-like though they be) are erroneous and oftentimes misleading to the patients. Medical practitioners should be careful not to use them, except in the very extremely few instances in which they may have a substratum of truth.

The one obvious exception is that Nos. (3) and (6), dealing with hæmoptysis and weak hearts in high altitudes, contain slight traces of truth, in that high altitudes are contra-indicated in (a) elderly subjects with hard arteries and high blood-pressure, suffering from hæmoptysis and with large cavities present; and (b) all persons suffering from organic heart disease, which is barely compensated, and where the compensation tends to break down on the slightest provocation.

TUBERCULOSIS, PULMONARY. (*See also* THORACIC SURGERY.)

W. H. Wynn, M.D., F.R.C.P.

ETIOLOGY.

Epidemiology.—It is well known to sanitarians, writes Emerson,¹ that the death-rate from tuberculosis in the United States, Great Britain, and Germany had been falling in a fairly uniform manner from the time of, or earlier than, the discovery of the tubercle bacillus till the outbreak of the World War. In the last fifty years there has been a fall of 77·9 per cent in the tuberculosis death-rate of New York; in the last eleven years of 51 per cent, and in 1921 alone a fall of 18·1 per cent. Of the factors concerned in this change he is inclined to lay most stress on the improved financial and living conditions of the poor, including in this decreased alcoholism. But combined with the social and economic events, which so far as the antituberculosis campaign is concerned are accidental and unplanned, there have been specific measures aiming at a direct attack upon the disease. Of these, none has been of so great value as early and accurate diagnosis. The influenza epidemic, paradoxical as it may seem, had a considerable influence in reducing recent tuberculosis mortality, as many who would have died of tuberculosis within the last four years died of influenza without record of the simultaneous tuberculous involvement. Reduction of non-pulmonary forms of tuberculosis did not keep pace with that of pulmonary tuberculosis in New York until all the milk was pasteurized except from cows free from tuberculosis. Since that time, 1914, there has been a reduction of non-pulmonary tuberculosis from a rate of 27 per 100,000 to 14 in 1921. Another factor not mentioned by Emerson is that the growing concentration of population has led to more universal exposure of the young under conditions favourable for resistance, whereby they acquire a greater or less degree of immunity to subsequent fatal infection.

A report of the U.S. Public Health Service² shows that between 1910 and 1920 the tuberculosis death-rate has been reduced more than twice as fast as the general death-rate. In 1910 the highest tuberculosis death-rate was among infants; in 1920 it was transferred to the age-period 15–44. This bears out Andvord's theory that the tuberculosis of adult life is the fruit of seed sown in infancy, and that the effects of a tuberculosis campaign are at first demonstrable only in the first years of life, the fate of persons who had passed childhood before this campaign having been already decided. While the tuberculosis death-rate for all ages was reduced only by 29 per cent, that for children under one year was reduced by 46 per cent, and that for children between 1 and 14 by 37 per cent. These results are traced chiefly to the removal of foci of infection from the neighbourhood of children.

With this fall in highly civilized countries has gone an increase in tuberculosis since the armistice in countries in which the disease was previously almost

unknown. Legendre³ points out that between the armistice and June, 1921, 1662 colonists suffering from tuberculosis contracted in France had been repatriated to West Africa, Madagascar, Indo-China, and the Pacific Islands. He prophesies that before long tuberculosis will be widespread throughout these regions, especially as underfeeding and alcoholism are rife. Furno also calls attention to the spread of tuberculosis since the war to the rural districts of Italy. Sprawson⁴ states that in India tuberculosis has much increased during the last forty years, especially in rural districts. Two important features among Indians are: (1) The very large number of cases of abdominal tuberculosis originating apparently in the mesenteric glands, and the almost universal early complication of abdominal tuberculosis in primary lung cases; and (2) The great frequency with which the disease shows itself in the puerperium or during lactation. The organism appears to enter by the intestinal route much more frequently than in European cases, and does so in massive doses.

Conjugal Tuberculosis.—Barnes⁵ found that of 2262 married sanatorium patients, 50 had consorts suffering from pulmonary tuberculosis. Probably the frequency of clinically demonstrable tuberculosis in the general population is just as high. Of 229 widowed patients, 93, i.e., 40 per cent, had lost their consorts by death from tuberculosis. Of over 3400 deaths among married people in the general community, only 12 per cent were due to tuberculosis. That is to say, the tuberculosis mortality among the consorts of sanatorium patients was more than three times as great as among married persons in the general community. Tillisch⁶ states that among 3151 sanatorium patients there were 1152 married persons, 85 (or 7.4 per cent) of whom had tuberculous consorts. In 13 there was a history of intimate exposure to infection before marriage. Thus there remained 72 cases of possible conjugal infection. In 50 the disease broke out within two years of the first known exposure to infection. In the remaining 22 the latent period was three years or more. Tillisch considers that the figures point definitely to dangerous infection occurring in adult life.

De Besche and Jorgensen⁷ investigated the notifications of pulmonary tuberculosis in married persons in Christiania, and found that of 742 such notifications there were 39 cases in which both husband and wife suffered from pulmonary tuberculosis. These 39 cases were carefully investigated, and it was found that in all but 11 there was actual or possible infection before marriage; but in 11 cases there was good reason for assuming that one partner had infected the other. They conclude that there is some risk of infection from wedlock with a person suffering from open pulmonary tuberculosis, but that the great frequency with which conjugal tuberculosis fails to occur confirms the view that considerable immunity is acquired by the adult who has grown up in a town like Christiania where there are ample opportunities for casual, intermittent, and slight infections.

Tubercle Bacilli in the Faeces.—Fried⁸ has examined the faeces of 126 sanatorium patients: 30 to 50 grm. of faeces were emulsified with normal saline. After filtration with sterile gauze, the emulsion was centrifugalized with a mixture of benzene and ether. The pellicle on the top was removed, and from this films were made and stained in the usual way. Of 103 patients with positive sputum, 98 showed tubercle bacilli in the faeces; 11 patients with negative sputum showed positive faeces in 3; in 12 clinically non-tuberculous patients the faeces were negative in all. Fried holds that when there are intestinal lesions the stools are so loaded with bacilli that from ten to a hundred or more can be found in each microscopic field, whereas when derived from sputum they are few in number. He controverts the idea that

non-pathogenic acid-fast bacteria can be found in human fæces and are derived from acid-fast bacilli in foods such as butter, and states that no one has been able to demonstrate acid-fast bacilli in non-tuberculous patients.

Tubercle Bacilli in Human Milk.—Chambrelet and Vallée⁹ have carefully examined the milk of 15 recently confined tuberculous women, and in only 2 found tubercle bacilli, and in both the sputum was swarming with bacilli. They conclude that these positive results, though few, demonstrate the fact that no tuberculous mother should be allowed to suckle her infant.

Prenatal Tuberculosis.—Whitman and Greene¹⁰ report a case of disseminated miliary tuberculosis in a still-born nine-months foetus. The mother had an area of dullness with râles at the right apex. The diagnosis was established by the histological changes and the presence of tubercle bacilli in the urine. They have collected 113 authentic and 519 doubtful cases of prenatal tuberculosis, so that the condition is no mere laboratory curiosity.

Vital Capacity.—Cameron¹¹ has examined the vital capacities in 223 male patients, 198 of whom had pulmonary tuberculosis of the adult type. He found that the vital capacity is always reduced in pulmonary tuberculosis, a fact of considerable significance in diagnosis. As a rule it is reduced in proportion to the grade of the disease. Two elements seem to be concerned in this reduction: (a) the element of toxæmia, and (b) the element of pathological structural change. In the early case the former is probably the main factor, whilst both play a part in the advanced case. The vital capacity increases when the patient improves, decreasing when he gets worse, and is therefore a reliable guide to progress. The test is of some value in estimating the work capacity, but the more moderate grades of diminution bear no definite relation to work capacity. The fairly advanced but temporarily quiescent type of case may have a vital capacity considerably reduced by anatomical causes, and yet may have a good work capacity. The moderately early case with slight anatomical change but active disease may have a much higher relative vital capacity and yet be quite unfit for any grade of work. Myers has correlated the symptoms, vital capacity, and physical and X-ray findings in 619 persons examined for pulmonary tuberculosis. In 149 with no physical signs, and in 89 with negative X-ray findings, the average vital capacity was 103 per cent. In 100 with chronic bronchitis it was slightly above 103 per cent. It was reduced to 92 per cent in 29 suffering from pleurisy. When the physical signs pointed to lesions of the lung parenchyma, the vital capacity was reduced in proportion to the extent of disease. Dreyer and Burrell¹² emphasize the importance of the vital capacity in the classification of cases of pulmonary tuberculosis, because it is possible to express numerically the injury to health which would otherwise depend on the individual interpretation of physical signs by different observers. Classification by physical signs alone may place a patient nearing death from an acute lesion in a high category, whilst another patient with satisfactory fibrosis and extensive cavitation, likely to live for several years, may be placed in a low category. It is important to take repeated readings at intervals. The vital capacity may also be useful in giving information as to the beneficial effects of different treatments.

Tuberculosis and Pregnancy.—Sergeant¹³ remarks on the difference of opinion as to the effect of pregnancy upon tuberculosis. Usually a much gloomier view is held by physicians than by obstetricians. This may be due to the obstetricians' observations being mainly confined to the periods of pregnancy and the puerperium, while physicians chiefly see the patients a considerable time after confinement. Now it is mainly, but not invariably, some time after confinement that symptoms of fatal tuberculosis develop. Demineralization, especially decalcification, is a well-established fact during pregnancy, and is

even more pronounced after confinement. Sergeant is in favour of the interruption of pregnancy as soon as signs of active tuberculosis develop. Norris and Murphy,¹⁴ in an analysis of the literature from 1915, find that the combined statistics of twenty-five authors show that from 50 to 94 per cent of pregnant tuberculous women become worse as the result of gestation. The combined averages of the series showed that in 64.4 per cent the pulmonary lesions became worse or ended fatally. Of 166 cases observed by themselves for three months after confinement, the pulmonary condition was improved in 30, showed no change in 62, was worse in 64, and in 10 ended fatally. The infantile mortality in the three months was 27.7 per cent. They maintain that prior to the fifth month of pregnancy the uterus should be emptied if the disease shows any evidence of becoming active. About 60 to 70 per cent will be benefited by this treatment. After the fifth month it is generally advisable to treat the patients expectantly. Labour should be made as easy as possible, e.g., by induction of premature labour two weeks before term, and forceps or version at labour. Unless the pulmonary lesions have been quiescent for a considerable time, tuberculous women should not marry, and they should not become pregnant unless the disease is in the first stage and has been quiescent for at least two years. Bar¹⁵ places great reliance on a lively reaction to tuberculin early in the pregnancy as a sign that the woman has resisting powers enough to stand the strain of childbirth. If the reaction is weak, he interrupts the pregnancy before the close of the fourth month. Abortion is the simplest method, but he prefers hysterectomy unless the woman is young and there is hope of recovery. He has induced abortion only in nine cases in the last fifteen years. One patient died three years later, but the others regained their health, and three have since had normal pregnancies. Hysterectomy in fifteen cases was always followed by marked improvement, and only one of this group died a few months later.

Bernard¹⁶ has no doubt of the sinister relationship of tuberculosis to the three phases of maternity—pregnancy, labour, and lactation: His first series of 164 tuberculous women showed that in 18 per cent the outbreak of tuberculosis coincided with pregnancy or labour. His second series of 327 patients showed 24 per cent with a recent history of pregnancy. More detailed analysis showed that 22 of these had exhibited the first signs of tuberculosis during pregnancy and 33 after confinement. Of patients whose disease had been aggravated or had shown a relapse of an old lesion, 14 had relapsed during pregnancy and only 11 after confinement. Relapses thus seem most frequent during pregnancy, while the first outbreak of disease is most frequent after confinement. Primiparæ numbered 63, multiparæ 29, so that in most cases it is during the first pregnancy that the disease most frequently breaks out. Among the 327 cases, in 81 the disease was initiated or aggravated by pregnancy, and in 85 the pregnancy seemed to have no relation to the tuberculosis. The author concludes that, when pregnancy supervenes, the chances of tuberculosis being aggravated or not are about equal. Bernard is not convinced that induction of abortion in tuberculosis is justifiable either scientifically or legally. Pinard¹⁷ was also strongly opposed to the interruption of pregnancy merely on account of tuberculosis in the mother, and declared that interruption was only indicated when the mother's life was in danger. He agreed with Rist that there was no proof that induction of abortion increased the woman's chance of survival.

Tuberculosis and Alcoholism.—Roch,¹⁸ under the title of the 'pseudo-Addisonian syndrome of old tuberculous alcoholic subjects', has described a condition of which he has seen sixteen examples. It develops at about the age of 60 in alcoholic vagabonds of robust constitution. The clinical picture

is that of Addison's disease, including asthenia, pigmentation, and digestive disturbances, combined with symptoms of fibro-caseous pulmonary tuberculosis and hepatic insufficiency. The disease is rapidly fatal, and the autopsy shows cavitation of the lungs, sclerosis, and fatty degeneration of the liver, but normal suprarenals.

Miners' Phthisis.—Much valuable light has been thrown upon the pathology of this disease. It was formerly taught that the inhalation of dust predisposed to tuberculosis through the mechanical irritation of the particles. It is now known that only silica dust has this property, and, as Collis pointed out, the history of the condition dates back to the dawn of human history. The lineal representatives of the prehistoric flint workers can be seen in the flint-knappers of Brandon, who have a mortality from dust phthisis of over 30 per 1000 per annum. Mavrogordato¹⁹ has followed up the epidemiological investigation of Collis, based upon occupational mortality data, and which suggested that chemical action rather than mechanical irritation was concerned. By experiments on animals he has shown that silica particles stimulate the production of macrophages, and that these when loaded with silica are protected from autolysis and digestion in the lymph. As a result they accumulate in and block the lymphatics. This does not occur with the other dusts studied. The cells tend to flock together and produce pseudo-tubercles. Silicosis results from fibrosis of these pseudo-tubercles and blocked lymphatics. Gye and Kettle²⁰ take the matter further by showing that colloidal silica is a cell poison, and that it is probable that finely divided silica can be broken up by living matter into the soluble colloidal silica. When silica is injected into mice along with tubercle bacilli, a necrotic coagulum is formed in which the bacilli can multiply, protected from the cellular defences of the body. This protection is only temporary, and in a few days the coagulum is absorbed. In the meantime, however, the small dose of bacilli has become a dose of considerable magnitude, and, as an important factor in determining an infectious process is the number of organisms introduced, a simple explanation is forthcoming of the effect of silica upon tuberculous lesions. The abnormal prevalence of tuberculosis among men exposed to silica dust may therefore be explained by (1) the destructive action of silica on cells whereby foci of necrosis are produced in which tubercle bacilli can multiply, and (2) the disorganization of the lymphatic drainage of the lung.

SYMPTOMS.

Secondary Infections Complicating Pulmonary Tuberculosis.—Wingfield²¹ holds that secondary infections are a cause of the lack of progress in a certain percentage of sanatorium patients, and that improvement can often be obtained by the use of vaccines. These cases show the following features: (1) Old-standing lesions; (2) periodical pyrexial attacks with sudden onset and short duration, from which they apparently recover completely; (3) Extensive lesions, usually with evidence pointing to cavitation—that is, large areas of abnormal lung and bronchial surfaces; (4) Streptococci, usually predominant among micro-organisms isolated from the sputa; (5) Pyrexial attacks, usually controlled or materially altered by the administration of autogenous streptococcal vaccine. The pyrexial attacks were not due to tuberculous auto-inoculations, and never coincided with increased exercise or an extension of disease recognizable by physical examination. The bacteriological examinations were made inside a large glass box with silk side curtains and armholes. The sputum was dried on sterile porcelain tiles until powdery. Cultures were then made on casein digest or meat agar-digest plates to which a little fresh human blood had been added. The micro-organisms found were streptococci,

staphylococci, and *M. catarrhalis*. In no case was the pneumococcus found. Friedländer's bacillus and a member of the mucous *capsulatus* group only appeared once. Vaccines proved of considerable value in the cases in which there was definite evidence that secondary infection was affecting the patient. In other cases the pyrexia seemed to be due to the tuberculosis and not to the secondary infection, and these were not amenable to vaccine treatment.

The Normal Child's Chest.—Much difference of opinion exists as to the interpretation of radiographic appearances in the chest, and it is necessary to obtain a knowledge of the appearances of the healthy chest before attempting to endow shadows with pathological significance. A group of physicians and radiologists was appointed by the National Tuberculosis Association (U.S.A.)²² to establish the X-ray and clinical findings in the chest of a normal child up to 10 years. In all over 500 children were studied, the ages being between 6 and 10. All showing signs of disease were excluded. They were of approximately normal height and weight, of various social strata, some with a history of exposure to tuberculous and other infections, some without this history. The data obtained by percussion and auscultation show wide variations from a fixed standard. These variations are usual, and should be considered to be within normal limits. Inasmuch as such changes are often dependent upon alterations that persist as the residua of past infections, a careful anamnesis is necessary if diagnostic errors are to be avoided. Even a history carefully taken is often unreliable, as minimal infections are soon forgotten. Failure to evaluate these deviations from a fixed standard will often lead to the unwarranted diagnosis of disease and to even less justifiable treatment. D'Espine's sign as indicative of enlarged bronchial lymph nodes is of little value. To establish the presence or absence of disease it is imperative that all data—clinical, laboratory, and röntgenographic—must be exhausted and correlated, and that no one fraction of the evidence be stressed to the exclusion of the others. The X-ray members of the Committee found that an attempt to describe a normal chest was practically impossible. It was the consensus of opinion that children are more apt to show definite X-ray evidences in the hilum and trunk shadows of simple as well as serious respiratory infections, than adults. Practically all children of the ages examined have had one or more respiratory infections, especially measles and whooping-cough, that are likely to produce very apparent changes in the shadows mentioned and will remain distinctly visible for a variable period. The following were the conclusions arrived at: (1) The normal chest of the child is subject to such wide variations within normal limits as to be beyond the possibility of exact description. (2) The hilum shadow when found lying entirely within the inner third or zone of the lung area can be disregarded, except where it is made up of a solid mass of homogeneous shadow giving undoubted evidence that it represents a growth or mediastinal pleurisy. (3) Calcified nodes at the root of the lung, without evidence of lung disease, are of no significance except as a possible evidence of healed inflammatory trouble, possibly but not necessarily tuberculous; they are a common finding in normal chests. (4) In the normal lung the bronchial trunk shadows are not visible in the extreme apical regions. For convenience, the remainder of the lung is divided into three vertical zones. The inner zone contains the root shadows. The middle zone contains the trunk shadows, gradually fading out into their final subdivisions. The peripheral zone contains radiating lines from these, fading off before the periphery is reached. Where in the mid-zone or peripheral zone these shadows do not disappear in the characteristic fashion described, the appearance may be evidence of a variety of conditions, past or present, of an inflammatory nature or otherwise. It may accompany a tuberculous process, but is not necessarily

indicative of tuberculosis. (5) The use of the terms 'peribronchial tuberculosis' and 'parenchyma tuberculosis' is not to be recommended, and until corroborated by laboratory or clinical findings the use of the terms 'active' and 'quiescent' should not be applied to evident lesions demonstrated on plates.

Paton and Rowand,²³ of the St. Andrew's Institute, describe the X-ray appearances of the chests of twelve infants from eight days to fifteen weeks. All were healthy and, except one, had had no illness since birth; the exception had had a slight coryza. All the cases showed definite shadowing, not homogeneous within an area, extending from the fifth to the eighth ribs and bounded externally by the semilunar line, extending outwards at the level of the sixth or seventh ribs, about three-sevenths of the total distance from the middle line to the circumference of the chest. This area contains the root of the lung. Radiating from this area all cases showed linear shadows, sometimes definitely arborescent. A basal group radiated downwards and outwards, and an upper group radiated upwards and outwards. Between these groups there is a wedge-shaped area in which no shadows are usually visible, though traces of horizontal streaking can be detected. They conclude that as these shadows are obtained in healthy infants they represent structures in the healthy lung and are not due to pathological changes.

DIAGNOSIS.

The Complement-fixation Test.—This test has attracted many workers, and its value in diagnosis is becoming more clearly defined. Punch and Gosse²⁴ give a critical survey of the subject. After performing the test in approximately 1000 pulmonary cases and controls, they formed the opinion that a positive result is an indication of an active tuberculous lesion in the body, and that a negative result is a reliable indication, with a few rare exceptions, of the absence of such lesion. In 160 cases there was definite pulmonary tuberculosis with tubercle bacilli in the sputum. All save 5 gave positive results, and 3 of these 5 subsequently gave a positive result. Some 140 presumably healthy persons or persons suffering from non-tuberculous diseases were taken as controls: 3 gave a positive result. Of these 3, in one enlarged—presumably tuberculous—glands were subsequently discovered; in another it was impossible definitely to exclude pulmonary tuberculosis; while in the third no evidence of tuberculosis could be found. Of the remaining 700 cases, 220 gave a positive result and 480 a negative. The subsequent history of 50 cases suspicious of tuberculosis, but which gave a negative reaction, was investigated, and after the lapse of ten to twenty months 49 showed no further sign of tuberculosis. One, subsequent to his first examination, lived for a year with a tuberculous brother and may have become infected. Fifty cases which gave a positive reaction but in which tubercle bacilli were not found were followed up; 8 had died, and, of the remaining 42, 29 attended for re-examination; 13 of these had been proved definitely to suffer from tuberculosis between the first and second examinations by the finding of tubercle bacilli. They point out that the variability of results obtained by various authors may be partially explained by the variety of antigen used. They consider that a dilute emulsion of living tubercle bacilli is the most reliable. Besredka's antigen, which may be classed as a tuberculin, is the best known, but it has been shown that it is not specific in that Wassermann positive serums may give a positive reaction with it.

Ichok,²⁵ of Besredka's laboratory, and using his egg antigen, found that in 900 persons tested the reaction was constantly negative in the non-tuberculous. In 54 children a positive reaction was obtained in 4, and in these tuberculous

lesions were found later. Mozer and Fried applied the test in 1005 cases of surgical tuberculosis, and report that it is as reliable as the Wassermann reaction with syphilitic disease of the bones. Armand-Delille, Hillemand, and Lestocquoy²⁶ think it premature to draw absolute conclusions, but state that out of 177 patients with tubercle bacilli in the sputum 163 gave a positive reaction. On repeated examination it was found that in some cases the antibodies disappeared temporarily, reappearing again later, showing that a single negative examination is valueless. Of 11 healthy adults, 4 gave strongly positive, one a weak positive, and 6 negative reactions. In 8 patients suffering from non-tuberculous affections the reaction was positive 5 times, no sign of tuberculosis being found clinically or radioscopically. They conclude that while the presence of tuberculous antibodies is frequent in definite cases of the disease, their absence does not warrant a verdict of arrest or cure, nor does their presence in a clinically healthy subject warrant a diagnosis of active tuberculosis. They used the methylic antigen of Boquet and Nègre.

PROGNOSIS.

Trudeau²⁷ discusses the bearing of the presence or absence of râles on prognosis, the paper being based on a study of 1000 cases. His conclusions are: (1) Cases in which no râles were found showed the highest percentage of cures. (2) Patients admitted with râles, but who lost them during their stay in the sanatorium, formed nearly as favourable a group. (3) In patients admitted without râles, but who developed them during treatment, the prognosis was much graver. (4) In spite of the greater frequency of tubercle bacilli in right upper lobe lesions as contrasted with left upper lobe lesions, the prognosis is considerably more favourable in the former class. (5) Basal râles should not be diagnosed tuberculous too lightly, for in nearly 50 per cent of this series tubercle bacilli were found, and nearly 40 per cent of these developed apical râles later. (6) The prognosis among cases in which the râles were limited to one or both bases was not more grave than in patients with râles over one or both lobes.

Löwenhjelm²⁸ records three long-standing cases in which râles could be heard up to the time of death, which in no case was directly due to the tuberculosis. The necropsies showed no recent tubercles or signs of activity in old tuberculous areas; but it was noticed that the râles corresponded to those parts of the lungs where healed tuberculous foci were found. As pleural adhesions are often situated over such foci, the râles may really be due to creaking of pleural adhesions; Löwenhjelm confesses to being unable invariably to distinguish between pleural and pulmonary adventitious sounds. The conclusion is that it is unwise to rely on râles in the lungs as proof positive of active tuberculosis when they are unsupported by other signs of activity.

Sanatorium Results.—Fowler²⁹ analyses the fate of 1364 clinically proved cases in the industrial classes two to six years after discharge. The total mortality was high—34.2 per cent—but 24.6 per cent of all cases were in an advanced stage. These cases accounted for more than half the deaths. Of the early (Turban Stage I), only 8.5 per cent are dead. The percentage of cases at work was 48.6. The chance of a Stage I case living for more than two years was four times greater than that of a Stage II case, and nearly nine times as great as a Stage III case. The mortality was five times greater in cases that came under treatment after tubercle bacilli had been found than in cases treated before they were found. The highest mortality was in the first two years after discharge, and if the patient survived for five years his chances of continuing to live were considerable. Of 1009 uncomplicated cases, 33.4 per cent died; but of 72, complicated with laryngeal tuberculosis, 69 per

cent died ; of 101 with other tuberculous lesions (glands, etc.), 54·5 per cent ; and of 139 with non-tuberculous lesions (goitre, etc.), 27·3 per cent.

Wiesner³⁰ has investigated the fate of 12,708 patients discharged from thirteen American sanatoriums, and 2043 patients from three English sanatoriums. At the end of the first year 37 per cent, at the end of the second year 41 per cent, at the end of the third year 41 per cent, and at the end of the fourth year 42 per cent, were dead. These figures show again that the first two years, and particularly the first year, are the critical time for the patient.

Howk, Dublin, and Knudsen³¹ show that very good results can be obtained by prolonged sanatorium treatment of early cases. They give the after-history of 953 patients discharged from the Metropolitan Life Sanatorium from 1914 to 1920. The proportion of incipient cases was 56 per cent, moderately advanced 37 per cent, and advanced 7 per cent. The large number of early cases was due to the annual medical examination of all the company's employees. In 1920 the proportion of incipient cases was as high as 70 per cent. The average duration of treatment was 7 months for incipient cases, 12 months 18 days for moderately advanced cases, and 14 months 10 days for far-advanced cases. Most of the patients on discharge went back to their homes and the same employment. Of 896 discharged before the end of 1920, 80 per cent were at work, 10 per cent unfit for work, and 10 per cent were dead a year later. Of 585 incipient cases, 545 were traced : 90 per cent were at work, 7 per cent unfit, and 3 per cent dead. In most cases the observation period was one of several years, up to seven years in some cases.

Lissant Cox³² contrasts the results in 2310 patients who completed a course of sanatorium treatment associated with dispensary supervision or treatment, and 1757 patients who underwent treatment at home or in institutions other than sanatoriums. The patients were under the Lancashire County Council scheme, and the two groups were as similar as possible. Of 1047 patients in the early and intermediate stages with negative or absent sputum commencing treatment during the years 1914-18, 14·0 per cent of the sanatorium cases had died at the end of 1921, and 37·7 of the non-sanatorium cases. Of the 1263 with positive sputum, 61·2 per cent of the sanatorium cases had died, and 81·3 per cent of the non-sanatorium cases.

TREATMENT.

Calcium Treatment.—Optimistic claims are made from time to time for various drugs in the treatment of tuberculosis, only to be succeeded by a pessimistic reaction. Calcium is having a wave of popularity, and many papers have appeared on the subject. Not only is it advocated for the treatment of hæmoptysis or diarrhœa, but also as a means of actually arresting tuberculosis. Attention has been drawn by several authors to the immunity to tuberculosis of workers in lime and plaster-of-Paris.

Maendl³³ has treated 250 cases with about 4000 intravenous injections of calcium salts. For hæmoptysis he injects 5 c.c. of a 10 per cent solution of calcium chloride, repeating eight-hourly as long as necessary. Apart from hæmoptysis, the drug is given every other day with pauses of a week or two between courses of 20 injections. By adding 0·25 gm. of antipyrin to a 10 per cent solution of calcium lactate he avoids various discomforts of the treatment. If some of the salt is deposited in subcutaneous tissue, necrosis is apt to follow. He has never succeeded in bringing down a very high temperature with the treatment, but has observed good effects on the cough, expectoration, night sweats, and dyspnœa. A curious sensation

of heat is a common sequel. Subfebrile temperatures especially responded well and became normal.

Ringer and Minor³⁴ give intravenous injections of 5 to 10 c.c. of a 5 per cent solution of calcium chloride. In 30 cases of tuberculous diarrhoea, benefit was observed in 17, pain and discomfort being relieved and the stools becoming less frequent. After a time the injections seem to become less effective, and have to be given at shorter intervals. Like Maendl they noted a strange feeling of heat beginning in the throat and extending over the whole body even after as little as 1 c.c.

Coutière³⁵ finds that the inhalation of calcium powders ten to twelve times a day for five minutes or more at a time is followed by a gain of weight and strength and disappearance of physical signs.

Garofeano³⁶ gives 15 grm. with syrup of lemon to disguise the taste. He has found these doses well tolerated, and has even given 35 grm. a day in obstinate or certain acute cases. At the same time he gives a diet poor in sodium chloride.

Prest³⁷ uses Collosol Calcium : 0.5 to 1 c.c. is given hypodermically every five days at first, and later once a week. In a further communication he expresses the opinion that 0.5 c.c. is sufficient, and that it is well to wait a week to see if there is any reaction ; in a number of cases injections need not be given more than once a fortnight. In acute febrile cases caution is required, and smaller doses used or small doses given by mouth. In two cases a reaction was observed, sputum containing tubercle bacilli appearing for the first time. He also gives the drug by mouth, 1 fluid drachm of 0.05 per cent collosol calcium one to three times daily. He considers that its action when given in this way is rather different than when injected. Oral administration in addition to injections seemed to be especially successful in reducing sputum and getting rid of tubercle bacilli. Graves³⁸ has introduced Collosol Calcium Lecithin in the hope that such a combination would be useful in cases of nervous exhaustion. As the proportion of calcium present in collosol calcium is only 1-2000, the amount in 0.5 c.c. is infinitesimal as compared with the doses given by Maendl, Blum, and others.

Rickmann³⁹ has treated 52 cases of tuberculosis with Krysolgan and found improvement in about 40 per cent. The most marked influence was seen in the case of laryngeal tuberculosis ; in pulmonary tuberculosis it was disappointing, and ill-effects such as lassitude, giddiness, and hyperpyrexia were observed. Some patients developed albuminuria, and one an acute nephritis. Gastro-intestinal disturbances were common. Schellenberg's⁴⁰ experience of the treatment in 79 patients was also disappointing, and complications occurred in several patients. Only three declared themselves better for the treatment. Bandelier and Roepke in the last edition of their text-book also find krysolgan disappointing, except possibly in tuberculosis of the larynx. They also emphatically condemn treatment with copper preparations. Calmette holds that it is essential that research in chemotherapy of tuberculosis should be based on scientific lines and conducted on experimental animals.

Treatment of Hæmoptysis.—Pissavy⁴¹ states that the value of the treatment of hæmoptysis by extract of the Posterior Lobe of the Hypophysis introduced by Wiggers in 1911 has been confirmed by several authorities. Intravenous injection of this drug is now the sole treatment of severe hæmoptysis in his clinic ; 1 c.c. of the extract is mixed with 10 c.c. of saline and injected slowly into a vein. As in half the cases the hæmorrhage does not completely stop until after a series of injections, he is in the habit of giving three consecutive injections at intervals of twenty-four hours. He points out that the hæmostatic action is due to the drug increasing the coagulability of the blood.

Wynn⁴² states that the best immediate remedy is an intramuscular injection of 1 c.c. **Pituitrin**, and he uses this as a routine in all severe hæmoptyses. If pituitrin is not available, he advises common salt—1 drachm in a tumblerful of water. This acts better when given intravenously; 10 to 20 c.c. of a 10 per cent solution are injected, great care being taken not to allow leakage into the subcutaneous tissue, or much pain may be caused. The injection can be repeated in one hour if necessary. Another useful measure consists in applying a **Tourniquet** round both thighs. The constriction should be continued for not more than two hours—usually half an hour is sufficient—and the band must then be slowly loosened in the course of ten to fifteen minutes. Morphia should not be required in slight hæmorrhages, and should be avoided in severe ones.

Saggis⁴³ has found intramuscular injections of **Emetine** succeed after other remedies had failed. The dose was 3 cgrm. of emetine hydrochloride, from 1 to 5 injections being given.

Artificial Pneumothorax.—The Tuberculosis Committee of the Medical Research Council has issued a report by Burrell and McNalty on artificial pneumothorax. It consists of two parts. In the first, Burrell deals with 150 cases treated by himself. He classifies these into three groups. In the first, comprising 107 patients, an efficient pneumothorax was produced; 40 patients showed arrest of disease, and 22 improvement; the remainder were no better, worse, or dead. In the second group, of 20, only a partial pneumothorax was produced, and treatment was continued for less than two months. In none was the disease arrested, and in only 3 was there some improvement. In the third group of 23, pleural adhesions prevented the induction of pneumothorax. The second part of the report gives the experience of sixteen physicians who have treated between 1250 and 1350 cases. A favourable answer was returned by all, but there was some difference of opinion as to the indications. Morriston Davies considers no case is too early, and that an early case does not necessarily mean that the patient has a good resistance and will therefore respond to ordinary methods. The general opinion was that institutional treatment should, as a rule, be given a fair trial before collapse treatment is adopted, and that when it is seen that the disease is not yielding to ordinary methods, artificial pneumothorax should be induced as soon as possible.

Gravesen⁵³ gives the results in the largest series of artificial pneumothorax cases yet published, that of the great pioneer Saugmann of the Vejleford Sanatorium, Denmark, who died in February, 1923. Of 211 third-stage cases (two to twelve years after discharge), a lasting positive result was obtained in 38 per cent of all cases in which a pneumothorax of any noteworthy extent could be established. The further classification shows why the results are not better, and the injurious result of adhesions. The tables show the condition of patients three to thirteen years after discharge.

Group 1.—Cases with complete pneumothorax without adhesions.

Able to work	..	..	33	..	70.2 per cent
Not able to work	..	..	1	..	2.1 "
Died from tuberculosis	..	..	11	..	23.4 "
Died from other causes	..	..	1	..	2.1 "
Unknown	..	..	1	..	2.1 "
			—		
			47		

Group 2.—Cases with complete pneumothorax but with localized extended adhesions.

Able to work	..	..	14	..	33.3 per cent
Died from tuberculosis	..	..	28	..	66.6 "
			—		
			42		

Group 3.—(a) Cases with incomplete pneumothorax but with larger adhesions.

Able to work	5	11.1 per cent
Died from tuberculosis ..	39	86.7 "
Died from other causes ..	1	2.2 "
	<hr/> 45	

Group 3.—(b) Cases with universal adhesions—no pneumothorax possible.

Able to work	9	11.8 per cent
Not able to work	3	3.9 "
Died from tuberculosis ..	63	81.8 "
Unknown	2	2.6 "
	<hr/> 77	

Miller¹¹ analyses the results in 50 cases treated over a period of seven years—13 were in the second stage and 37 in the third. One to seven years after treatment the results were: well and working, 17; living but not working, 16; and dead, 17.

Ringer⁴⁵ writes that brilliant though immediate results frequently are, the cold light of statistics shows that the percentage of permanent complete recoveries obtained is disappointingly small. Its use in hæmorrhage is of the greatest value. It is often an immediate life-saver, frequently a life-prolonger, not seldom a bringer of comfort and relative relief from distressing symptoms. In 101 cases in which at least partial collapse was obtained, 85 could be traced. Of these, 41 were dead, 5 dying, 25 living but incapacitated for work, and 14 well. The dead and dying together made a total of 54 per cent. Among 140 patients treated by artificial pneumothorax by Peters and Woolley⁴⁶ at the Loomis Sanatorium, 75, or 53.6 per cent, developed a pleural effusion; in 9 this became purulent. In 60 cases the effusion appeared in less than six months, and in only 4 after the first year. When the effusion was considerable it was found best to remove it, but with moderate effusions little was gained by aspiration. Whatever the treatment adopted it was found difficult to prevent adhesions and reduction of the pleural space. In 34 the fluid was examined by animal inoculation, and in only 7 were tubercle bacilli found.

Gendron,⁴⁷ of Nantes, who reports a case, remarks that cases of bilateral artificial pneumothorax are rare, only 10 being recorded. In his case artificial pneumothorax was performed on the left side in a woman patient in 1919. In 1921 she became pregnant, and the right lung showed an active focus. The left collapse was discontinued, and a pneumothorax inducted on the right side and kept up for ten months. The left lung showed no signs of activity, and rapidly recovered its functional power.

Soltan⁴⁸ reports 20 cases of artificial pneumothorax under 16 years of age; 13 were between the ages of 13 and 15; the youngest was 5, and the remainder were 9, 10, and 11. In two cases collapse was prevented by adhesions. Of the remaining 18, of whom 10 had tubercle bacilli in the sputum, relief was only temporary in 7, and they died within a year. In 10 (5 with T.B.) the results were excellent. Pehu, Cordier, and Bonate⁴⁹ consider that artificial pneumothorax is much less frequently indicated in children than in adults, as unilateral disease is infrequent under 10, pleural adhesions are more frequent, and compression of the lung is difficult owing to the stretching of the mediastinum. Out of 250 tuberculous children the operation was only attempted in 8, and in 4 of these it was quickly abandoned owing to signs developing in the other lung.

Nathan Barlow⁵⁰ urges that artificial pneumothorax should not be regarded as a treatment of tuberculosis, but as merely an adjunct to treatment. Owing to the clinical symptoms being suppressed, the usual guides to treatment

fail. He maintains that these patients should continue to receive the treatment for tuberculosis which would be adequate and would be given if the signs and symptoms had not been masked by the pneumothorax.

Jacobæus⁵¹ discusses the technique and indications of his method of **Cauterization** with the galvanocautery to remove adhesions in artificial pneumothorax.

Of 78 cases, the method has been technically successful in removing adhesions which prevented collapse in 55. The clinical result has not been so favourable, as only 49 patients became symptom-free.

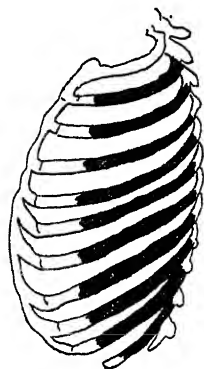


Fig. 94.—Amount of ribs resected in Friedrich operation.

Extrapleural Thoracoplasty.—Brown and Eloesser⁵² discuss very fully the operations for thoracoplasty. Broadly speaking, surgical collapse is indicated in patients who should have a pneumothorax but in whom a pneumothorax is impossible. Artificial pneumothorax should always be attempted first as the procedure of choice. Chronic fibrous phthisis with thick pleural deposits and a rigid chest wall offers the most frequent indication. The Brauer-Friedrich operation consists in the removal of large sections of the second to the tenth ribs through a big flap incision. The operation has too great a mortality to be of wide use, but may be indicated in patients in whom a thick or resistant pleura or mediastinum separates the chest into two distinct compartments. Its sphere will probably be limited to the after-treatment and collapse of

open tuberculous empyemas. Sauerbruch's operation collapses the chest by resecting smaller portions of all the ribs through a paravertebral incision. It is much less mutilating, diminishes the thoracic volume as much as the other operation, and produces collapse without robbing the chest of its rigidity. The ribs must be resected close to the spine. Five cases are recorded, and in three the operation was completed at one sitting. There was no untoward result, and all five patients have improved. All have gained weight, look well, and the disease has been arrested or diminished in extent. (See Figs. 94-97.)

Gravesen⁵³ also follows the Sauerbruch technique. Since 1916, 105 patients have been operated on at Vejleford. Death from operation occurred in 9. Of the remaining 96 patients, 64 obtained a positive result (43 were relatively cured or much improved, 21 improved); 2 of these died later from influenza; 32 derived no benefit, and the majority of these have since died. A partial thoracoplasty should be considered sufficient when the affection is localized to a limited area

of lung, or when a partial pneumothorax has been so established as to provide collapse for the upper or lower part of the lung. With universal affection of a lung an ineffective pneumothorax should be discontinued in favour of a complete thoracoplasty. Whether the operation is done in one or two stages depends upon the individual patient; the two-stage operation is the less risky. When complete collapse has not been obtained by the usual operation, in a few cases the anterior ends of the upper ribs, except the first,

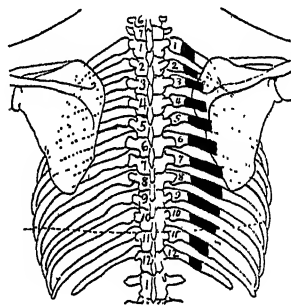


Fig. 95.—Amount of ribs resected in Sauerbruch operation.

have been resected or an extrapleural apicolysis has been performed. Bull⁵¹ has performed thoracoplasty on 75 tuberculous patients since 1914. Of these, 46 are alive, 25 being free from symptoms and able to work, 9 still have symptoms, and in 12 the result is not yet determined. He performs the operation in two stages, resecting ribs eleven to five in the first operation and the remaining ones after two to three weeks. The ribs are resected as far back as possible; 6 to 7 cm. of the eleventh rib are removed, 12 cm. of the tenth and ninth, and 15 cm. of the following up to the fourth; as much as possible is taken of the three uppermost, generally 12 cm. for the third, 10 cm. of the second, and 2 to 3 cm. of the first. The total amount resected varies from 90 to 180 cm.

Jacobæus and Key⁵⁵ deal with 60 cases, 15 of whom became fit for work and 19 definitely improved. They find that the operation is more successful on the left than on the right side. In only 14 of their cases did the healthier lung appear to be perfectly normal or the seat of only slight hilum changes. In the remaining 46, X rays or physical examination showed definite disease of the healthier lung. Their experience shows that it is not so much the extent and localization of the disease in the healthier lung that matters as its character. Even half the lung may be involved if the disease is arrested, and thoracoplasty be justified.

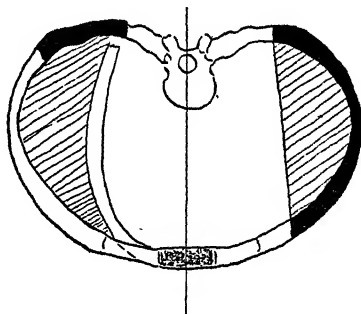


Fig. 96.—Diagram of cross-section of chest. Friedrich's resection on the right side, Sauerbruch's on the left; amount of rib removed shaded black. Although the amount of rib resected in the Sauerbruch operation is much less, the collapse is almost, if not quite, as great as after the Friedrich operation.

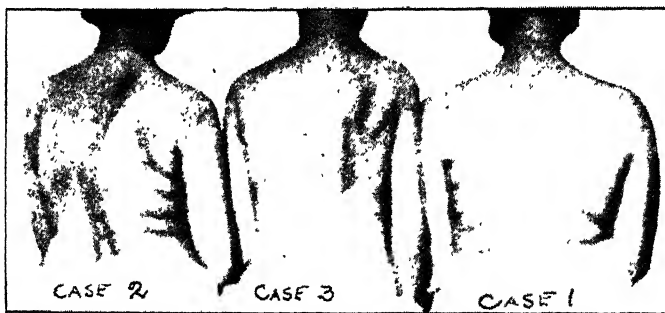


Fig. 97.—Case 1. After operation. Collapse of left side. Gain in weight. Case 2. After operation. Collapse of right chest. Marked scoliosis. Case 3. After operation. Collapse of right chest. Marked scoliosis.

(Figs. 94-97 redrawn from 'Archives of Internal Medicine'.)

Heliotherapy.—There is a prevalent opinion that intensive sun treatment in pulmonary tuberculosis is not only disappointing but harmful. In sanatorium treatment the action of direct sunlight is not provided for, but rather is avoided. But there is much difference between the unsystematic and improperly dosed sunbaths and skilled heliotherapy. Schürer⁵⁶ utilized the treatment in

patients with well-marked lesions. The sun baths were taken on the roof of a hospital sheltered on two sides from wind. The only cases not given heliotherapy were those with marked cachexia and high fever, those too weak to wash themselves, and those with large cavities or pneumonic processes. Hæmoptysis was not regarded as a contra-indication. The patient was slowly acclimatized, starting for five minutes with the legs only exposed, and gradually increasing with exposure of the arms and chest until in twelve days a complete sun bath of an hour's duration was allowed. In twenty-four days two hours was reached, and in some cases three hours. As an indication of the dose the subjective symptoms were more important than the exact number of minutes the treatment lasted. In no case did the temperature rise more than 0.2 to 0.3° , and no case showed any fresh activity, and in no case did hæmoptysis occur. The blood-pressure was usually slightly lowered by the sun bath. As compared with ordinary hospital treatment the results are said to be remarkably good, improvement taking place in several advanced cases which would have been given up under ordinary circumstances.

Gödde⁵⁶ uses the **Quartz Lamp**. He radiates the chest and back three times a week, gradually increasing the duration. He has treated 655 cases in the last eight years. In 57 cases there was a decided reaction with increase of signs, and hæmoptysis was noted in several. Gödde advises that the treatment should not be given to advanced cases. When patients are under careful supervision he does not think a reaction is injurious, but rather that it leads eventually to an improvement.

Tuberculin.—*The Percutaneous Method.*—Moro, in 1907, showed that a specific reaction followed the rubbing into the skin of tuberculin suspended in an ointment base, and Petruschky later showed that tuberculin could be absorbed through the unbroken skin when a liniment containing it was applied. Philip,⁵⁷ who has used the percutaneous method for treatment for some twelve years, is convinced that focal reactions can be brought about. He uses either Koch's original tuberculin or Béraneck's tuberculin in strengths from 10 to 50 per cent. The following is a suitable formula :—

R	Tuberculin	10-50 per cent	|	Eucerin	ad 100
	Eucalyptol	5 per cent			

For simple cases treatment may be commenced with 25 per cent tuberculin. In young subjects, or cases with numerous foci, 10 per cent is advised. When the response to the lower strength is slight, the proportion of tuberculin is increased, attention being paid not only to the local response but to focal and general effects. About 0.1 c.c. of ointment is rubbed into the cleansed skin, over an area of 1 to 2 square inches, with a glass rod. The inunction is repeated once a week. The method is especially recommended for children on the earliest sign of chronic glandular enlargement, in order to counter the process of tubercularization at a time when the advancing infection is limited to the lymphatic system.

Crocket⁵⁸ uses an ointment of tuberculin (T. or P.T.) and lanolin, one in four or less up to equal parts, for glandular and abdominal tuberculosis. For pulmonary tuberculosis the tuberculin is mixed with tinct. camph. co., 1 to 5 min. of tuberculin to 1 drachm of the tincture. The application is made every three to five days. He considers it a powerful method for good which can be easily and safely administered.

Spahlinger Treatment.⁵⁹—As a result of experimental researches, Spahlinger has introduced a method of treatment based in the first place on a destruction of tuberculous toxins, and in the second place on therapeutic vaccination. He points out that tuberculosis in man may be divided into two classes : (1)

Acute forms in which the symptoms are attributable to various toxins derived from the tubercle bacillus, associated sometimes with those of secondary infections : it is to these that the complex antitoxin is applicable. (2) Chronic forms amenable to active immunization by bacillary extracts. The products he has prepared can be classified under (a) vaccines, and (b) antisera. The majority of cases are given vaccines. Serum is used in rapidly progressive cases. The vaccines are essentially tuberculins. Tubercle bacilli are treated by various processes, and four vaccines are made. The complete course of treatment consists of successive courses of each of these four vaccines. The complete antiserum is made by mixing a large number of partial antisera, each obtained from a horse which has been subjected to some particular course of injections. The partial antisera are of different kinds ; some are obtained by injecting tubercle bacilli or their products into horses, others by injecting other varieties of bacteria found in mixed infections. The former group of partial sera is divided into bacteriolytic sera and antitoxic sera, the latter being prepared by injecting products which are called toxins, and which are obtained from tubercle bacilli by elaborate methods.

By the treatment, therefore, it is sought : (1) To produce active immunity by the injection of a vaccine ; and (2) To produce passive immunity with an antiserum having antitoxic and bacteriolytic properties. There is no new principle involved in the method, the only novelty being in regard to the technical details and exact methods of preparation. So far Spahlinger has preferred to keep these methods secret, so that no investigation of his claims is at present possible. Several physicians have reported good results from the treatment. We understand that the supply of complete serum and vaccine was practically exhausted in 1914, and that since that date only small amounts of partial serum have been prepared. The chief interest in his work lies in his claim to have made an effective antitoxic serum. No potent ectotoxin has hitherto been prepared from tubercle bacilli, and Spahlinger has not yet published experiments to show that he has been more successful than others, nor is there any proof that his serum contains antitoxins. The claim seems to be based on the fact that cases of rapidly advancing tuberculosis have been arrested by the use of the serum.

Rappin has also made a sero-vaccine from tubercle bacilli which have been cultured since 1914. Doussain⁶⁰ gives an account of the work, and refers to numerous cases markedly benefited by the treatment. Vaccinated guinea-pigs two years after infection with virulent tubercle bacilli are not only still living but show no signs of infection.

Boyd⁶¹ has prepared a serum by injecting living bacilli into an ass, this animal being chosen because of its natural resistance to tuberculosis. The whole blood of the ass is injected into patients in a proportion of 10 c.c. of blood to 1 c.c. of a 1.5 per cent sodium citrate solution. Only three cases treated by the method are recorded, but the research is being continued.

Defatted Tubercle Antigen.—In 1910 Deycke and Much showed that the tubercle bacillus consists of several distinct chemical substances, to each of which they believed the human body reacts in a specific manner. On this assumption they based their partial antigen system of treatment. Since then there have been numerous attempts to separate the acid-fast envelope from the tubercle bacillus. In 1918 Dostal and Sahler⁶² prepared 'Tebecin', a vaccine obtained from pure cultures of tubercle bacilli grown on media to which a saponin had been added. Reports of the use of this vaccine have been favourable. Jentzer⁶³ and his colleagues prepared a mixture of fats, lipoids, and waxes sold under the name of 'Gamelan', which, it is claimed, stimulates the tissues to produce ferments which saponify the fatty constituents

of the tubercle bacillus in vivo. There is both experimental and clinical evidence in its favour. As both tebecin and gamelan are secret remedies, the claims made for them must necessarily be treated with reserve.

Crofton⁶³ has used for the past ten years an antigen in which living tubercle bacilli have been treated with benzoyl chloride, so obtaining a complete solution of the bacilli, including the lipoidal portion. Thompson's detoxicated tuberculin is treated with an alkali solvent to separate the protein from the lipid and wax portions. Douglas and Fleming, in 1921, showed that acetone-extracted bacteria formed vaccines, which, judged by antibody production, were better than unextracted bacteria killed by heat.

Dreyer^{64,65} has advanced the matter further, and, believing that the lipoidal substances which conferred acid-fast and Gram-staining properties upon bacteria protected the specific bacterial protein and prevented their liberation from the body of the bacterium, thus preventing the adequate stimulus for immunity reaction, he made experiments to determine whether it was possible to remove the lipoidal substances and still retain the antigenic power of the bacteria. It was found that when tubercle bacilli and also Gram-positive bacteria were first treated with formalin and then acetone-extracted, the lipoidal portion could be removed. By animal experiments it was proved that these defatted bacteria retained their antigenic powers and could give rise on injection to antibody formation. Further experiments showed that the defatted antigen could bring about a definite improvement, both general and local, in animals infected with tuberculosis. The antigen was then used for the treatment of human patients by Inman, Fildes, and Western, and Douglas. Fildes and Western report 60 cases of tuberculosis of various organs, including 4 of pulmonary tuberculosis, and they state that in their opinion the improvement is of an order which exceeds obviously that obtainable by any other form of treatment which is applicable to these conditions. Further investigations are being conducted under the auspices of the Medical Research Council.

[The specific treatment of tuberculosis is engaging the attention of many serious workers, and, while it is premature to express an opinion, it seems probable that through many converging lines of research a successful method for the treatment of tuberculosis may be discovered in the near future. But whatever the method may be, we can feel sure from the nature of tuberculosis that it will not be a treatment which can be applied indiscriminately to all cases of tuberculosis by untrained persons. As with tuberculin treatment, which in this country has suffered much from prejudice and secondhand opinions, individualization and painstaking care will be the keynote of success.

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TUBERCULOSIS OF SKIN. (See SKIN, TUBERCULOUS CHANCRE OF.)

TUBERCULOSIS OF SPINE. (See POTT'S DISEASE.)

TYPHOID FEVER. (See also PARATYPHOID FEVER.) *J. D. Rolleston, M.D.*

ETIOLOGY.—A. Loir and H. Legangneux¹ state that twenty years ago about 300 persons died annually at Havre from typhoid fever, but since then not more than 20 deaths annually have been due to this cause. This great drop in the mortality is due to the supervision of the drinking water. At the present time other factors than drinking water are more frequently the cause of typhoid fever in large towns—viz., milk, mussels, oysters, radishes, and flies. The likelihood of an epidemic being due to a carrier should always be considered when the cases notified are agglomerated within a small area in which the inhabitants are likely to have the same provider, especially of sweets, creams, and ices.

S. Peller and V. Russ² describe an epidemic of typhoid, chiefly affecting children in a school in Austria, and traced to a female carrier in charge of the kitchen; 61 children were attacked, and there were 25 other cases of contact infection, making a total of 86 cases; 87 per cent of the whole series were children. Between 6 and 8 years every fourth child, between 9 and 10 every third child, and between 11 and 13 more than a third, contracted the disease.

The eleventh annual report³ on typhoid in the 69 cities in the United States with a population of more than 100,000, shows that the year 1922 marks the lowest point yet reached in the typhoid record of the large cities. The slight check that occurred in 1921 (see MEDICAL ANNUAL, 1923, p. 479) to the almost steady decline of the last twelve years, has been followed by a further decrease. As compared with 1921, the typhoid rate was diminished in 46 cities and increased in only 23, the mortality being now only 3.15 per 100,000, or a little less than one-sixth of the rate (19.59) for the large cities of the United States in 1910. In three cities with an aggregate population of 473,975, there was not a single death from typhoid in 1922. The main causes of indigenous urban typhoid in the United States at present appear to be contact with typhoid cases and typhoid carriers, occasional cases from contaminated shellfish, from bathing in polluted water, and perhaps in some cities from the improper disposal of excreta. Relatively few cases appear to be caused by polluted drinking water, by milk-supply, or by inadequate sewerage. A considerable number of the typhoid deaths in the large cities do not originate in the city itself, but are due to infection contracted outside.

SYMPTOMS AND COMPLICATIONS.—Commenting on the recent paper by A. Rodet and S. Bonnamour (see MEDICAL ANNUAL, 1923, p. 479) on *secondary infection* with the specific organisms in typhoid, M. Bloch and P. Hébert⁴ state that secondary infections are extremely rare in this disease, as among 19,285 blood cultures from typhoid patients examined at the Bar-le-Duc Central Hospital from 1915–19, there was not a single case, apart from contamination, in which bacilli or Gram-positive cocci were associated with the typhoid bacillus.

Favre and Dumas⁵ describe a case of *typhoid septicæmia* in a man, age 40, characterized by quotidian and tertian attacks of intermittent fever. Apart

from slight congestion of the liver and jaundice, there was no visceral localization, the spleen could not be felt, and there were no gastric or intestinal symptoms. Typhoid bacilli were found in the blood, but no malarial parasites; Vidal's test was positive in a dilution of 1-150, and typhoid bacilli were also present in the urine. Two similar cases had been previously reported by Bourges.

The term *arthrotyphoid* was given by Robin and Leredde in 1894 to that form of typhoid fever in which the onset simulated acute articular rheumatism. Thiroloix and Harmelin,⁶ who allude to another example recently reported by Guillaïn (see MEDICAL ANNUAL, 1921, p. 484), record a fatal case of this kind in a youth, age 17, admitted to hospital with swelling of the knees and tibio-tarsal and mid-tarsal joints. Seven days after the onset the patient developed pneumonia, and shortly afterwards began to have a series of profuse and repeated hæmorrhages, consisting of hæmaturia, epistaxis, mælæna, ecchymoses, and meningeal hæmorrhage. Blood cultures showed the presence of *B. typhosus*, and Vidal's reaction was positive. No fluid could be obtained from the joints for cultivation. Post mortem, intestinal ulceration, consolidation of both lungs, enlargement of the spleen, and myocarditis were found.

M. Klippel and A. Feil⁷ report a case of *spontaneous recovery from typhoid perforation* in a woman, age 27, who died of bronchopneumonia seven days after presenting symptoms of peritonitis. The rapid disappearance of the signs of peritonitis, as well as the recovery without operation, suggested that the diagnosis of perforation was mistaken; but the autopsy showed a perforation in the ileum in course of cicatrization. Similar cases were described by Hartmann in 1908 and Bucquoy in 1879.

A. S. van Heukelom,⁸ who reports two cases, illustrates the rarity of *jaundice* in typhoid fever by the following statistics: Murchison saw only one case; Griesinger, among 600 typhoid patients, saw ten instances, including cases of cholelithiasis; Biermer saw one example among 695 typhoid cases; Liebermeister, among 1420 cases, saw 26 patients with jaundice; while Osler, among 500 typhoid cases, did not see a single instance of jaundice. Among 1500 cases of jaundice seen at the front, Garnier and Reilly saw only one due to typhoid bacilli. In the first of van Heukelom's cases, which occurred in a man, age 42, most of the characteristic symptoms of typhoid were absent. The blood culture, however, was positive on two occasions, and the high continued fever and relative bradycardia were characteristic. In the second case the jaundice was a coincidence, being due to biliary obstruction by *Ascaris lumbricoides*.

Marchiafava and Nazari⁹ describe a case of rupture of an aneurysm of the abdominal aorta following *ulcerative aortitis* in typhoid. The patient was the Roumanian statesman, Take Jonesco, whose sudden death on the eighty-ninth day of disease was due to this cause. On the fifty-second day of disease, when he appeared to be convalescent from typhoid, the temperature rose again and he began to complain of pain in the lower part of the abdomen and thighs, especially on the left side, the pain continuing until death. No previous example has been described, following typhoid fever, of development of an aneurysm due to acute infective arteritis.

G. Paiseau and Clayeux,¹⁰ who allude to Etienne's cases (see MEDICAL ANNUAL, 1922, p. 484), record that of a woman, age 34, who on the thirtieth day of typhoid developed *phlebitis*, first of the left and then of the right lower limb. The abnormal features of the case were the extensive œdema due to involvement of the common iliac veins, and affecting not only the lower limbs, but also the abdominal wall, lumbar region, and base of the thorax, and the attacks of quotidian intermittent fever lasting for about three weeks. Blood

cultures, which had become negative three days before the first attack, showed typhoid bacilli again on two occasions during the attacks. Phlebitis, though a fairly frequent complication of typhoid in the adult, is very rare in children. F. Pozzo¹¹ reports a case in a girl, age 10, in whom phlebitis of the left femoral vein occurred in convalescence. Recovery took place.

T. G. Miller and C. C. Wolfert¹² who report two cases of *gangrene and exfoliation of the bladder* in typhoid, state that only six undoubted examples of this complication have previously been recorded. The etiology is obscure. All the eight cases have occurred in women, all but one of whom were catheterized, thus affording an opportunity for direct introduction of pathogenic organisms through the urethra. All but two of the recorded cases were fatal. Both the writers' cases died of general sepsis, pyelonephritis being present in one of them.

F. Rost¹³ records two cases of *rupture of the rectus muscle* due to Zenker's degeneration, which closely simulated intestinal perforation owing to the sudden attack of abdominal pain. In the first case laparotomy was performed, and only a hæmatoma of the rectus was found. In the second case the pain and rigidity were so strictly localized to the rectus that its rupture was diagnosed without exploration.

According to L. Bériel and Morenas,¹⁴ who describe a case in a woman, age 30, *progressive muscular atrophy* is a rare complication of typhoid, as, apart from four cases reported by Guillain in 1907, they have been unable to find any others on record. In the present case the symptoms developed in convalescence from a severe attack of typhoid. When the patient was seen by the writers ten years later, the muscles of the buttocks and thighs showed a marked pseudo-hypertrophy, while in the upper limb atrophy was the prominent feature, especially in the deltoid and triceps.

L. Auricchio¹⁵ records five cases of the *association of typhoid or paratyphoid with Malta fever*, in each of which the symptoms of typhoid infection were most pronounced at first. Treatment with antityphoid vaccine acted almost exclusively on the typhoid symptoms, and had little effect on the course of the Malta fever, which had to be treated by a specific anti-Malta-fever vaccine.

According to J. Boullard,¹⁶ who records two cases of *typhoid simulating acute pulmonary tuberculosis*, in girls, age 12 and 15, but ending in recovery, typhoid fever in rare cases closely simulates acute pulmonary tuberculosis. The intestinal symptoms in such cases are ill marked, and the signs at the pulmonary apices pronounced and persistent. The diagnosis is very difficult. Blood cultures do not yield certain results, except during the first ten days, and Widal's test may not be positive until an advanced stage. The prognosis of these pulmonary forms of typhoid is good, as they usually end in recovery, and convalescence is uneventful.

In a paper based on fifty cases of *typhoid in children*, H. S. Whiting¹⁷ comes to the following conclusions: (1) Typhoid in children is not so serious a disease as in the adult. Only two of the cases died—a mortality of 4 per cent, as compared with a mortality of 7 per cent in adults—and complications were comparatively uncommon and mild. No instances of intestinal hæmorrhage or perforation occurred in the series. The only serious complications were septic adenitis and bronchopneumonia, which ended fatally. There were two cases of otitis media, three of superficial abscesses, and two of osteomyelitis. (2) Typhoid fever is a septicæmia with localization in the intestine, except in very young patients, in whom there may be no intestinal lesions. (3) The principal symptoms do not differ from those in the adult, except that the fever is more irregular, the pulse is faster in proportion to the fever than in the adult, and there may be a predominance of nervous manifestations.

A. de Verbizier²⁸ reports a case of malignant typhoid in a man, age 25, cured by Colloidoclastic Shock. After two intravenous injections of colloidal gold he developed a violent reaction, with shivering, sweating, and syncope. The following day the temperature fell to 98.6° and kept down, and the blood cultures taken two days, after the temperature had fallen were negative. [Treatment by 'shock' should be employed with great caution in typhoid fever. It is particularly contra-indicated in cases complicated by intestinal hæmorrhage or cardiac enfeeblement.—J. D. R.].

P. Hauduroy and Arsimoles²⁹ report a case of typhoid simulating dysentery which was cured by giving the patient by mouth a mixture of various strains of D'Hérèlle's Bacteriophage (anti-Shiga, anti-Flexner, anti-typhoid, and anti-paratyphoid).

Treatment of Carriers.—J. P. Walt³⁰ records a case of a chronic typhoid carrier in a woman who had been associated with five outbreaks of typhoid, with a total of eight cases, in the course of eighteen years. Treatment with Detoxicated Vaccine was commenced, the dosage in thousand millions being as follows: 1, 2, 4, 6, 8, 10, 12, thereafter rising by additions of 1000 million each time to 30,000 million. The vaccine was given subcutaneously at intervals of five days. There was no constitutional reaction of any kind until the last few doses, when headache, sleeplessness, and severe backache developed, as well as a smart local reaction round the site of inoculation. The most interesting feature in the case was the fact that typical typhoid bacilli were at first isolated, and later the organisms became atypical, giving the sugar reactions, but failing to agglutinate. Finally, neither *B. typhosus* nor the atypical bacillus was recovered from the stools after 18 successive examinations.

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TYPHUS FEVER.

J. D. Rolleston, M.D.

EPIDEMIOLOGY.—In his account of the typhus-fever epidemic among the Greek refugees, Sir Patrick Hehir¹ states that the brunt of the epidemic was borne by the larger towns, e.g., Athens, Salonica, Patras, and Corfu, the smaller towns escaping to a considerable extent. The outbreak attained its maximum intensity in mid-winter, when the people were more crowded together. The housing conditions of the refugees, and hardships, especially insufficient food and exposure, considerably lowered their resistance to disease.

W. A. Wovschin² states that in peace time under the Czar's régime about 100,000 cases of typhus were reported yearly from various parts of Russia. About 70 per cent of the cases occurred among the rural population and 30 per cent in the towns, this being due to the better hygienic condition of city dwellers as compared with the unclean habits and environment of the peasants in the villages. During the great epidemic of 1918-20, however, conditions were reversed: the cities had an incidence amounting to 70 per cent, while the rural quota was reduced to 30 per cent, the reversal being due to the migration *en masse* which took place from the villages to the big cities. The peasants remaining in the villages were unable to sell their food through lack of

transport, or did not wish to sell it to the Bolsheviks in the cities, and were forced to eat it themselves. The result was that their better nutrition and absence of overcrowding enabled them to offer better resistance to infection. The mortality-rate as a whole was about 10 per cent; in crowded places, prisons, camps, and barracks, it was about 40 per cent, and among doctors, nurses, and hospital attendants about 20 per cent.

According to P. Modinos,³ typhus has long been endemic in Egypt, where during the last fifteen years there have been 148,150 cases, with 42,599 deaths, and during the period 1916-20, 94,057 cases, with 25,332 deaths, or a mortality of 27 per cent.

ETIOLOGY.—In the report of the Typhus Research Commission of the League of Red Cross Societies to Poland, S. B. Wolbach, J. L. Todd, and F. W. Palfrey,⁴ as the result of careful researches carried out under exceptionally favourable conditions, came to the conclusion that *Rickettsia prowazeki* is the cause of typhus. Their most important evidence is that contained in the experiments showing that the virus of typhus and *Rickettsia prowazeki* are inseparable in infective lice, while next in importance is the presence of bodies indistinguishable from *Rickettsia prowazeki* in human lesions.

According to J. A. Arkwright and A. W. Bacot⁵—both of whom were infected in the course of their investigations at Cairo on the etiology of typhus, the latter fatally, although neither had been in contact with a typhus patient—lice are one, if not the chief, source of laboratory infections with typhus, though other means of infection, such as puncture with infected dissecting needles, cannot be ignored. It is very probable that the virus in louse excreta can enter the body through abrasions or slight wounds.

SYMPTOMS AND COMPLICATIONS.—F. S. Hone⁶ reports an outbreak, which has occurred during the last two years in and around Adelaide, of cases resembling typhus clinically and serologically, among persons of both sexes, age from 10 to 65. No deaths occurred, and the cases were on the whole of a mild type. The patients in hospital were nursed in general wards with no special precautions, and no further cases occurred among patients or nurses. Apart from pyrexia, the most prominent symptom during the first week was headache. The rash appeared on the fifth to seventh day on the abdomen and chest, and subsequently spread to the back, upper arms, and thighs. Deferescence occurred about the twelfth to fourteenth day by rapid lysis. In the fifteen cases in which the Weil-Felix reaction was used, agglutinins occurred in dilutions varying from 1-80 to 1-10,000. In no case did the serum agglutinate *B. typhosus* or *B. paratyphosus* A or B. The chief objection to the diagnosis of typhus was that no evidence of infestation with body lice was ever discovered, and in only one case were head lice found.

According to Gratzosky, Stroë, and Coccias,⁷ typhus occasionally assumes a *meningeal form* in children, of which they record three examples in patients 2, 3, and 7 years of age respectively. The meningeal symptoms consisted in strabismus, inequality of the pupils, nuchal rigidity, exaggerated reflexes, and positive Kernig and Brudzinski signs. On lumbar puncture a clear fluid was obtained under hypertension, containing abundant lymphocytes and a few red cells and polymorphonuclears. One of the cases was fatal, and the autopsy showed meningeal infiltration and a large quantity of cerebrospinal fluid, slightly blood-stained. The others recovered in nine and ten days respectively.

N. Hirschberg⁸ discusses the *nervous complications* of typhus.

1. *Peripheral Nerves.*—Neuralgia is not uncommon, and constant pain in the lower limbs, with tenderness of the nerve trunks and muscles, are still more frequent. The neuralgia disappears after the temperature becomes normal, or later in convalescence, while the continuous pain, which is an early

symptom, may last a year or longer. Apart from pain, the patient may complain of paræsthesia or hyperæsthesia. In addition to symptoms of nerve irritation, complete paralysis with degenerative muscular atrophy is not uncommon. Neuritis of the ulnar nerve is most frequent, and then in order of frequency the long thoracic, circumflex, median, and musculocutaneous nerves are involved.

2. *Cranial Nerves*.—Hirschberg saw 15 cases of neuritis of the optic nerve, 6 of choked disc, 2 of oculomotor palsy, 16 of facial paralysis following otitis media, and 5 of auditory neuritis.

3. *Central Nervous System*.—Hirschberg has not met with a case in which typhus was responsible for disease of the *spinal cord*, though he has often seen instances of its unfavourable influence on pre-existing spinal cord disease, such as tabes or disseminated sclerosis. *Bulbar symptoms* such as dysphagia, dysarthria and Cheyne-Stokes respiration were frequent. *Cerebral focal symptoms* due to hæmorrhage, thrombosis, or œdema were observed in 124 cases. Right hemiplegia occurred in 85, and left in 39. Serous meningitis was the cause of a certain number of symptoms, such as headache, tenderness of the cervical vertebræ, vomiting, grinding of teeth, muscular twitching, and sluggish or absent pupillary reactions. Several cases of chorea and hysteria were observed in convalescence.

In a review of recent Russian work on typhus, L. Cheinisse⁹ states that Roubachev estimated that one out of three typhus cases developed some form of *surgical complication*, whereas in typhoid fever the proportion was one in ten. Complications of the soft parts, such as boils, cutaneous or subcutaneous abscesses, and cellulitis, were the most frequent, and then, in order of frequency, vascular lesions, lesions of bone, and of the lymphatic system. Other complications were much less frequent. *Gangrene of the lower limbs* in typhus has been much commoner in Russia during the last few years than in all previous epidemics. Dmetrev is quoted as having observed the complication in 173 out of 9239 cases of typhus; only 13 of the 173 recovered. *Spondylitis*, which is well known as a complication of typhoid under the name of 'typhoid spine', was observed by Roubachev, who states that spondylitis following typhus is much milder than typhoid spine; though Totzky maintains that the symptoms and pathological changes are the same in both diseases.

A. Gregory¹⁰ has observed 15 cases of *intestinal gangrene* caused by arterial thrombosis among 7237 typhus patients. The complication usually sets in 18 to 60 days after the onset of the disease, and runs a fairly typical course. The patient suddenly complains of abdominal pain, and vomits once or twice. There are pain and muscular rigidity on palpation, especially at McBurney's point, constipation, rapid pulse, and normal temperature. These symptoms, which constitute the first steps, usually last 9 to 14 days. In the second stage, which lasts 7 to 10 days, a distinct aggravation of the condition occurs: the abdominal pain becomes generalized, vomiting is more frequent, the pulse more rapid, and in place of constipation there are two or three liquid stools daily. In the third stage the pain ceases, the pulse becomes imperceptible, and death takes place in 1 to 3 days. Operation was performed in 8 cases: in 6 in the second stage, and in 2 within the first few days. In the two latter an artificial anus was made in the cæcum; one recovered and the other died of pneumonia. All the cases on whom no operation was performed were fatal, as well as those operated on in the second stage.

IMMUNITY.—A. Schnabel,¹¹ who remarks that typhus is one of those infectious diseases of which one attack confers an immunity of long duration, if not permanent, records the case of a medical woman who, three and a half years after a severe attack, exposed herself to fresh infection by artificially infected

lice. The Weil-Felix reaction became positive again, the agglutination titre rising from 1-10 to 1-200, but no clinical symptoms developed. The change in the Weil-Felix reaction is best explained on the hypothesis that the immunity was not absolute but relative, being sufficient to prevent any symptoms, but not to prevent the formation of *x* 19 agglutinins.

DIAGNOSIS.—Sir Patrick Hehir¹² states that among 275 cases in which the *Weil-Felix* reaction was performed, the reaction was not present until the sixth day. In some it did not appear till the seventh, eighth, ninth, or tenth day; in two it was not present until lysis started; in one it was first met with on the last day of the fever; and in one case it did not occur at all, so that the reaction was absent in only 0.36 per cent of the cases. A certain number of cases gave a positive Widal reaction in 1-20, but the reaction remained stationary at this point, whereas the *Weil-Felix* reaction became more pronounced daily, usually reaching its acme on the twelfth to fourteenth day.

T. Mironesco, Tomovici, and Dumitresco¹³ examined the *dialysis* reaction in more than 100 cases of typhus, and found it constantly positive, its intensity being greatest at the onset of the disease, but still remaining positive, though in a diminishing degree, a few days after the fall of the temperature.

B. Roman¹⁴ states that, though not nearly as pathognomonic as the typical nodules seen on histological examination (see MEDICAL ANNUAL, 1919, p. 456; 1922, p. 486), the leucocyte picture in typhus is characteristic enough in conjunction with other evidence, or even alone, to warrant an opinion in difficult cases, especially in differentiating typhus from typhoid. In only one point does the blood in typhus behave exactly as in typhoid, viz., in the complete disappearance of the eosinophils. In distinction from typhoid, however, the blood in typhus shows a leucocytosis from the first, usually of the polymorphonuclear type. The leucocytes in typhus show the following peculiarities: (1) The polymorphonuclears present a gradual diminution and breaking down of the nuclear chromatin, and vacuolization of the protoplasm; (2) A marked increase in the large mononuclears; (3) The appearance of Türck's 'irritation cells' in comparatively large numbers; (4) A conspicuous number of basophil leucocytes or real mast cells.

H. Turcan¹⁵ attaches considerable diagnostic value in typhus to the obstinate insomnia which defies any treatment, the blackish-brown coating of the mouth and tongue, and the quiet delirium which is of the professional type. Each of these symptoms may be more or less marked, but it is rare for one of them to be entirely absent, except in extremely mild cases, which are practically only seen in countries where the disease is endemic.

PROPHYLAXIS.—J. S. Magat,¹⁶ after alluding to the good results obtained by prophylactic inoculation of defibrinated blood, as recorded by other observers (see MEDICAL ANNUAL, 1920, p. 370; 1922, p. 487), records his own experience. The blood was taken from patients at the height of the eruption—i.e., about the seventh day—defibrinated, heated for about an hour in the water-bath to 58° C., and then tested for sterility by inoculation of agar plates. Three injections were given, in doses ranging from 1 to 6 c.c. Magat found that there was a higher incidence of the disease among those who had been inoculated three times than among those who had not been inoculated at all, and that the disease was as severe, and as liable to be attended by complications, as in the uninoculated.

TREATMENT.—P. Modinos³ has treated twelve cases of typhus with a Vaccine prepared from cultures of *Proteus x* 19 and containing 3000 million organisms per c.c. The injections were given subcutaneously in the subclavian region or outer side of the arm without producing any local reaction. The dose was $\frac{1}{10}$ c.c. on the first day, and was increased by $\frac{1}{10}$ c.c. daily until $\frac{1}{2}$ c.c. was

reached. Although the temperature did not fall until after the third or fourth injection, the patient's general condition considerably improved after the first. Not only did all the cases recover, but the duration of the disease was shortened and no complications ensued.

Retchminsky, quoted by Cheinisse,⁹ advocates an abortive treatment consisting in **Mercurial Injections** (cyanide or salicylate of mercury in doses of 0·007 to 0·008 grm. daily). From his experience of this method in 51 cases, he concludes that if it is employed during the first four days it may cut short the disease, whereas if it is used later its action is doubtful or nil.

REFERENCES.—¹*Lancet*, 1923, ii, 153; ²*N. Y. Med. Jour.* 1922, ii, 578; ³*Paris méd.* 1923, i, 425; ⁴*Med. Science*, 1922, vii, 195; ⁵*Brit. Jour. Exper. Pathol.* 1923, 70; ⁶*Med. Jour. of Australia*, 1923, i, 435; ⁷*Brit. Jour. Child. Dis.* 1923, 95; ⁸*Deut. med. Woch.* 1923, 816; ⁹*Presse méd.* 1922, 581; ¹⁰*Zentralbl. f. Chir.* 1923, 507; ¹¹*Deut. med. Woch.* 1923, 972; ¹²*Lancet*, 1923, ii, 210; ¹³*Bull. et Mém. Soc. méd. Hôp. de Bucarest*, 1923, 47; ¹⁴*N. Y. Med. Jour.* 1922, ii, 575; ¹⁵*Presse méd.* 1922, 512; ¹⁶*Klin. Woch.* 1923, 1406.

UNDULANT FEVER.

Sir Leonard Rogers, M.D., F.R.C.P., F.R.S.

A. Gow¹ deals with the incidence of undulant fever in South Africa, and considers that the disease was probably introduced long ago by Angora goats, while more recently Swiss goats have been imported, which were probably free from the disease when they arrived, but some of them are now infected, and the consumption of their milk is a danger. Strachan first recognized the disease in South Africa in 1904, but it is now widespread, cases having recently been recorded in Cape Town, East London, Kimberley, Johannesburg, and Pretoria, as well as in a number of country districts, while the danger is increased by an increasing tendency of urban labourers to keep goats under insanitary conditions for milking purposes; the introduction of a single infected animal thus becomes a potential source of danger, the temperature of the country being favourable to the disease.

D. P. Marais² also draws attention to the danger of undulant fever spreading in South Africa; discusses its possible relationship to the *Bacterium abortus* of Bang in animals, which is indistinguishable from the *M. melitensis* by cultural or serological tests: and refers to the danger of chronic cases of undulant fever, with only occasional slight rises of temperature and symptoms of debility or neurasthenia, being overlooked unless serologically tested. He advocates the **Vaccine** line of treatment for the disease, combined with **Arsenical Preparations**. R. G. Archibald³ records an acute typhoid-like case infected in Khartoum and only recognized by blood cultures shortly before death.

REFERENCES.—¹*S. Afric. Med. Record*, 1923, Dec. 23, 475; ²*Ibid.* 459; ³*Jour. Trop. Med. and Hygiene*, 1922, Feb. 15, 55.

URETER, DISEASES OF.

Sir John Thomson-Walker, F.R.C.S.

Geisinger¹ found 4 cases of *duplicated ureter* in a series of 400 cases, and previously published a series of 100 cases in which 3 instances of duplication occurred; so that in 500 cases the percentage of occurrence of duplication of the ureter, the commonest anomaly perhaps of the urinary tract, was 1·4. He emphasizes the importance, when pathological conditions exist, of making an accurate diagnosis of the anomaly present, and this he thinks is most difficult in the case of the simple bifurcated ureter, the discovery of which is usually accidental. To avoid mistakes in this respect it is best in any case of doubt to take a uretero-pyelogram made with a 'plugging' catheter low in the ureter, so as to demonstrate graphically the conditions existing at the other end.

Crowell² considers that all patients complaining of chronic abdominal pain should be X-rayed, and that most of them should have the ureters catheterized

before they are submitted to operation. Ureteral stricture is, comparatively speaking, infrequent, and when it does occur it is usually associated with tuberculosis of the bladder or kidney. He differs from Hunner both in his conception of ureteral stricture and his method of diagnosing this condition. *Ureteral kink* is probably one of the most frequent causes of abdominal pain, for any chronic non-tuberculous infection of the renal pelvis and ureter will cause both lengthening and dilatation of the ureter, with a resulting kink. In tuberculous infection the lumen of the ureter is not enlarged as a rule, but its walls are thickened. Among other causes of ureteral kink are aberrant blood-vessels, nephroptosis, and adhesions following abdominal operations. He has seen beneficial results follow the use of a ureteral indwelling catheter in cases of ureteral kink the result of an infective process, and has left such catheters *in situ* for as long as three days. The best results may be expected from this mode of treatment when the infection has not been of long standing and when the ureters are not greatly dilated.

Buerger³ considers that cystoscopic intervention is advisable in almost all cases of *ureteral stone* within a short period of the entry of the stone into the ureter. It is not possible to predict in which cases impaction with blockage will occur. By the passage of one or more ureteral catheters, of bougies and catheters, or bougies alone, ureteral drainage can be established and a definite effect produced upon the descent of the stone; even large stones $\frac{1}{2}$ inch in diameter can be so dealt with, effectively preventing complications and relieving pain. Buerger finds that the greater the distance between the stone and the kidney, the less the chance of severe infection and extensive destruction of the latter; therefore it is most important to further the passage of the stone to the lowest possible part of the ureter. Two classes of cases may be recognized: (1) Those with a calculus in the lower pelvic ureter (true pelvis); and (2) Those with the stone in the lumbar ureter (false pelvis). In the first class the procedure depends upon whether the obstruction met with is passable or impassable. If passable, when the catheter meets the obstruction it is rotated on its long axis and, if necessary, withdrawn and re-introduced. Having finally surmounted the obstacle and evacuated the contents of the ureter and pelvis, a single catheter may be allowed to remain for an hour or so, or preferably a second catheter is passed if possible beyond the stone. The procedure is difficult and requires patience, and it may be accompanied by the injection of olive oil or glycerin into the ureter. The two catheters having been passed beyond the obstacle, they should be introduced 25 cm. or more, so that in withdrawing the cystoscope they may not be dislodged into the bladder. The catheters are left to drain for an hour or more. In removing, the catheters should both be pulled out simultaneously, when considerable resistance may be encountered. Adhesion of the catheter to the stone takes place sometimes, but it is by friction that the stone is usually dislodged. Where catheters cannot be passed at first, filiform bougies may be used until dilatation is sufficient to allow of the passage of first one and then a second catheter. Uninfected cases may be treated as out-patients; but in the presence of a not too severe infection indicating operation, it is best to keep the patient in bed during the in-lying of the catheter. Silver nitrate irrigations of the renal pelvis are recommended both after evacuation of the renal pelvis and before removal of the catheters. When impassable obstruction is present, the ureter below is injected with oil or glycerin, with or without adrenalin and novocain, and a catheter is introduced and followed by one or more small bougies (3 or 4 F.), which are employed with a view to passing the obstruction. If these fail, olivary dilators are introduced into the ureter, the lumen being gradually dilated by

the successive employment of olives of increasing size. The author recommends treatment on the above lines at weekly intervals in uncomplicated cases.

With stone in the lumbar ureter the impaction is less easily surmounted, and a small calculus may occasionally be pushed back into the pelvis of the kidney. The general methods employed are the same. When by any of the above methods a calculus of considerable size has been dislodged and has become arrested in the intramural portion of the ureter for some time, the upper lip of the ureter can be incised with scissors, the stone grasped with forceps and directly removed, or dislodged into the bladder and extracted with an evacuator.

Fowler and Waterman,⁴ in a paper on ureteral calculus, state that there is clinical evidence to support the belief that a specific stone-forming infection, and mechanical conditions leading to stasis, may be etiological factors of importance. Most writers lay stress on the renal origin of calculi, admitting that small stones may occasionally form in the ureter, possibly at the site of a stricture. Numerous factors influence the migration of a stone: muscular spasm, œdema following on trauma, local infection, diverticulum, or stricture. The shape rather than the size determines the liability to impaction, and it is in the lower ureter that most stones are arrested; indeed, it is stated that few calculi pass the lower 3 cm. of the ureter without becoming impacted at least temporarily. Owing to the indefinite symptomatology it is a rule at the Mayo Clinic to make an X-ray examination: (1) When abdominal pain is not definitely localized to such regions as those of the gall-bladder, the appendix, or the pelvis; (2) When, though the pain is definitely localized to one of these parts, there is pus or blood, or a history of such, in the urine; and (3) When in the absence of abdominal pain there is a history of pus or blood in the urine, or there is present microscopic pus or blood in the catheterized specimen. Investigation by X rays is by far the most important diagnostic aid, for the percentage of failure in the hands of a skilled radiologist is put at from 6 per cent to less than 1 per cent by Young. In cases of doubt an opaque catheter is passed and a double exposure is made on the same plate by moving the tube slightly and retaking, while the patient and the plate remain stationary. If doubt still remains, ureterography may help, although, according to Geraghty and Hinman, the passage of a wax-tipped bougie is the most accurate method of detecting ureteral calculi unless the stone lies in a ureteral pouch. Many small stones pass spontaneously, many more may be made to pass by intra-ureteral manipulation; but, as the diagnosis is often made late, open operation should not be delayed unduly; thus, in 400 cases, 51 nephrectomies had to be performed. A kidney incision affords access to the upper ureter, and a suprapubic incision, if ample, gives extraperitoneal approach to the lower ureter. The operative mortality of ureterolithotomy is low, and in a large percentage of cases a cure, symptomatic at any rate, is obtained.

In a series of 118 cases of ureteral calculus observed by Walther,⁵ 105 were dealt with by Trans-urethral Instrumental Methods. Of the remaining 13 cases, ureterotomy was performed in 8 on account of the large size of the stones present, while 5 either refused treatment or were lost sight of. He considers that approximately 90 per cent of ureteral stones can be removed trans-urethrally. The best methods of doing this are: (1) By mechanical dilatation of the ureter, (a) by the passage of olivary-tipped catheters (6 F.), especially if a catheter can be insinuated past the stone and, even more so, if two catheters can be passed beyond the stone and the stone caught and withdrawn; (b) by the passage of an 11 F. Garceau catheter past the stone; (c) by the use of the dilating olives introduced by Buerger; or (d) the Bransford Lewis dilator;

or, finally, (e) by utilizing the flexible metallic ureteral sound fitted with a terminal filiform guide which screws on to an 11-F.-sized olivary tip. This he has found of value when the above-mentioned instruments have failed. (2) The injection of an anæsthetic such as novocain and papaverine, or the instillation of an oil such as sterile olive oil or liquid petrolatum, which have, however, proved less satisfactory in his hands. Merely shifting the axis of a stone with re-establishment of ureteral drainage gives almost instant relief of pain. For stones impacted at the ureteral orifices, division of the margin of the ostium by **Fulguration** is efficacious. The intervals at which ureteral dilatations can be given vary, but five-day to fourteen-day intervals are the most usual.

Stricture of the ureter he considers to be a definite clinical entity and is important, especially in dealing with abdominal pain in women. The three main ætiological factors are pyogenic infection, calculus, and tuberculosis; calculus is of great importance in this respect, for some of the most severe ureteral strictures that he has observed have occurred in patients who gave a history of having previously passed a ureteral stone. Ureterograms, although of value at times, may mislead, for spasmodic contraction of the ureter occurring at the moment the X-ray photo is taken may show 'strictures' which in reality do not exist. Treatment is by **Dilatation**. The author has observed 16 cases, 13 in women and 3 in men; 9 of the women had previously undergone laparotomy without relief of symptoms, while 7 women and 2 men had previously passed ureteral stones, and in all cases of the series complete relief followed dilatation. After relief of symptoms and after the ureter has been dilated, yearly dilatations over a period of five years should be carried out.

Hepburn⁶ calls attention to a form of *ureteral obstruction* which he regards as being due to a *spasmodic contraction* of either the circular muscle fibres situated at the ureteral orifice or those fibres of the bladder muscle which surround the ureter in its intramural portion. Should this obstruction persist, as he believes it may do for considerable periods, hydro-ureter, hydronephrosis, infection, stone-formation, and destruction of renal parenchyma may follow. He reports four cases in which he found this condition of spasm present.

Green,⁷ in a paper on *stricture* of the ureter as an explanation of some obscure abdominal conditions, states that stricture usually occurs (1) just below the renal pelvis, (2) 3 or 4 cm. below the pelvic brim, and (3) in the 'broad ligament portion' of the ureter, the last being by far the most common site, whereas the first is extremely rare. Most writers consider the acquired type to be by far the most frequent. The congenital type is thought to be due to the persistence of fetal valves, or to actual twists in the ureter. The colon bacillus, staphylococci, streptococci, and gonococci are the organisms most frequently found. Sometimes a severe ureteritis, trigonitis, or urethritis without stricture is found, or one or all of these conditions associated with stricture and dependent upon a focal infection elsewhere are met with. As a rule the effect of ureteral stricture on the kidney and ureter is a gradual dilatation, but sometimes atrophy of both occurs. There is usually a history of urinary symptoms for some years, not uncommonly dating from childhood. If and when a catheter can be passed, a steady stream of urine is very suggestive of hydronephrosis and stricture. Extreme pain when the catheter passes through the area of ureteritis or stricture, and free bleeding from the mere passage of a catheter, are other suggestive signs. Distention of the renal pelvis and ureter with fluid, and measuring the returned fluid, is a valuable diagnostic aid, and during its performance the patient often complains of pain similar to that from which she has suffered for years. The most definite means of diagnosing a stricture is the passage of a catheter tipped with a wax bulb. Obstruction met with on introduction is of little value as compared

with a definite 'hang' and grating sensation felt as the wax bulb is withdrawn through the stricture. Finally, a pyelo-ureterogram is taken to corroborate or otherwise the previous findings, and to furnish a standard for future comparisons. As regards treatment, the passage of a catheter with a wax bulb should be done not oftener than once in eight or ten days, depending upon the amount of reaction after a treatment. The renal pelvis is irrigated before the catheter is removed, and for this purpose the author uses a 1 per cent solution of silver nitrate. Frequently a marked reaction after the gentlest of treatment occurs, and this in itself is suggestive of ureteritis and stricture.

Cumming⁸ states that up to the present 49 cases of *leucoplakia of the urinary tract* have been reported in the literature. The condition is much more common in the bladder than in the renal pelvis, and in the former it is readily recognized on cystoscopy. Histologically there is replacement of the normal transitional epithelium by a stratified squamous epithelium consisting of many layers and showing on the surface varying degrees of keratinization. In the author's case the renal pelvis was found to be filled with dry keratin flakes. The etiology is vague: stone, infection, or carcinoma occurs, associated with leucoplakia in many but not in all cases. The symptoms are those of associated conditions, most commonly those of stone, tuberculosis, or tumour. The painless passage of epithelial membrane has, however, been noted. Operative treatment of advanced cases is indicated, and for leucoplakia of the renal pelvis nephrectomy will often be required.

Aschner⁹ describes in detail a case of *squamous-celled carcinoma* of the ureteropelvic junction associated with leucoplakia of the renal pelvis, occurring in a man of 38, and discusses the literature of primary tumours of the ureter, of which he has collected 47 cases. Of these, 21 were papillomata, 12 papillary carcinomata, and of non-papillary carcinomata 4 were of the squamous-celled type and 10 of the medullary type. Of the papillomata, 8 occurred under the age of forty-five. Hæmaturia was known to have occurred in 11, and hydronephrosis was present in 10. In 4 cases the tumour was seen to protrude from the ureteric orifice on cystoscopy, and in 4 ureteral calculus was also present. Hæmaturia was noted in all cases of papillary carcinoma but one, and hydronephrosis was found in 8. In 2 cases the growth was seen on cystoscopy, and in 1 tumour was diagnosed by the presence of atypical epithelial cells in the urine. In 2 cases blood was seen issuing from the ureteric orifice, and, on the passage of a ureteral catheter, obstruction was encountered, with increase of bleeding on manipulation of the catheter. Ureteral calculus was present in 2 cases, and in 5 peri-ureteral infiltration and involvement of the regional lymph glands or distant metastases in spine, liver, or lungs were found. Non-papillary carcinoma was reported 14 times; 4 patients were under the age of forty-five. No mention of associated leucoplakia was made. A protruding tumour was observed twice on cystoscopy, and obstruction to the passage of a ureteric catheter also occurred twice. Hæmaturia was noted in 4 cases, and in 8 hydronephrosis was found. In 11 instances peri-ureteral extension or metastasis had rendered the case hopeless, and associated calculus was noted twice. Hæmaturia, pain due either to renal colic, chronic distention of the renal pelvis, or to peri-ureteral extension, and, finally, hydronephrosis are the commonest symptoms. In only 4 cases of the series was a pre-operative diagnosis made in the absence of a tumour visible on cystoscopy. Where no tumour is visible on cystoscopy, an examination should be made while the patient is free from hæmaturia, and at such a time an obstruction in the ureter with bleeding on manipulation of the catheter after the exclusion of calculus should arouse suspicion. Ureteropyelography may demonstrate a definite filling defect with a dilatation above it.

Thomson-Walker¹⁰ has examined 42 cases of actual or supposed urinary disease where *calcified abdominal glands* were found. One of two groups of glands was usually affected, one, the more common, lying at the lower part of the abdomen on the right side, and the other toward the upper part of the abdomen on the left side. In one case shadows were present on both right and left sides. Except in 3 cases, no focus of tubercle elsewhere in the body was found on clinical examination; in these three, however, two boys of 13 and 14 years of age had urinary tuberculosis, while the third, a man of 41, had widespread tuberculous infection. The author does not think that tuberculous mesenteric glands are a frequent source of renal infection, even in children. In only one adult case could a clear history of illness in childhood affecting the abdomen be obtained. The cardinal symptom of calcified abdominal glands is pain, and it was prominent in 25 out of 28 uncomplicated cases. It varies from a dull ache to a very acute pain, resembling that of renal pain or renal and ureteral colic, in 17 cases, of appendicitis in 4, and of biliary colic in 1. The pain was not influenced by movement, and vomiting was absent, as was retraction of the testicle and pain referred to other parts of the body. Hæmaturia may also be a symptom, but this statement is put forward tentatively. In one case quoted there had been severe intermittent hæmaturia for eight years, as the only symptom. The X-ray shadow thrown by such glands is most likely to be confused with that of stone in the renal pelvis or ureter, or gall-stones, and the author describes in detail the differentiation of such shadows. The careful taking of pyelograms is the most exact means of differentiation, but even with this fallacies exist, and in such cases lateral radiography combined with pyelography is invaluable.

In 11 of the cases the calcified glands were removed by operation, and in one of these a renal calculus was removed in addition. The results have justified the operation, in that pain and hæmaturia have disappeared, but whether the operation should be recommended in all cases where calcified mesenteric glands are discovered is open to discussion. Tuberculous peritonitis is not a concomitant or a sequel, and peritoneal adhesions do not form. In children, however, in whom there is some probability of other more recently infected glands being associated with the calcareous glands throwing the shadow, this view is subject to modification. In adults, operation is only justifiable in those cases in which symptoms are severe and are proved, as the result of thorough investigation, to be directly due to the calcified glands.

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URETERS, TRANSPLANTATION OF. (See BLADDER, DISEASES OF—EXSTROPHY.)

URINE, INCONTINENCE OF. (See INCONTINENCE.)

URTICARIA. (See also SKIN DISEASE IN CHILDREN.)

E. Graham Little, M.D., F.R.C.P.

Duke¹ reports a very singular case of hypersensitiveness to sunlight in a woman, age 43, who had acquired this condition about four years previously to being seen, and in whom the sensitization became increasingly evident. Wheals on the skin appeared within five and a half minutes after exposure of the skin to sunlight for two and a half minutes. This effect was not produced by heat, by X rays, or by ultra-violet rays produced by a quartz lamp.

Neither the urine nor the blood serum of the patient showed any hæmatoporphyrin. The author quotes Betz's experiments, in which he was able to make himself hypersensitive to light by the intravenous injection of 0.2 gm. of hæmatoporphyrin, and this sensitization persisted for several months. When in this condition Betz exposed a small area on his arm to Finsen ray and thereby produced a deep ulcer on his arm which healed very slowly. Comparison is made between these effects and those observed in this patient, but no photodynamic substance could be detected in the author's patient.

Angioneurotic Oedema.—Barber² brings considerable evidence for ascribing cases of this group to a bacterial, rather than to a food or protein, sensitization, and says that septic foci should be looked for. Apical abscesses in the teeth, a chronic appendix, an affected tonsil, suppuration in the nasal sinuses, are frequent associations. While condemning indiscriminate removal of tonsils and adenoids in early childhood, he points out the mischief of an incomplete operation on the tonsils, the scar of which often merely covers a deeply-infected focus. The best indications for complete removal of the tonsils (and that is the only operation he recommends) are injection of the anterior palatal folds and of the tonsillar tissue, the presence of septic matter in the tonsil, and enlargement and painful swelling of the lymphatic glands draining the tonsils. Several interesting cases are quoted illustrating these associations.

As regards treatment, the foci of sepsis should of course be removed where possible; autogenous vaccine treatment is highly recommended, but it should be controlled by specific tests (intradermic tests with the autogenous vaccine, for example: cutaneous tests with stock vaccines he finds of little value).

The commonest organism found was the *Streptococcus longus*, but the *Bacillus coli* infections may produce urticaria, and much less frequently the *Staphylococcus aureus*.

REFERENCES.—¹Jour. Amer. Med. Assoc. 1923, June 23, 1835; ²Guy's Hosp. Rep. 1923, Jan., 1.

UTERUS, AFFECTIONS OF. (See also DYSMENORRHOEA; GENITAL PROLAPSE.) W. E. Fothergill, M.D.

Retroversion.—L. J. Stacy¹ has made an attempt to estimate the frequency and importance of retroversion of the congenital type by examining 1000 consecutive cases of unmarried women, from 15 to 45 years of age, who had no record of pelvic infection, pelvic tumour, or pregnancy. Retroversion was found in 202 cases (20.2 per cent), which may be compared with Polak's statement that one woman in every five has retroversion, congenital or acquired. Stacy finds that many of the patients with congenital retroversion have other evidences of deficient tissue-supporting strength, such as scoliosis, enteroptosis, and poor muscular development. In the true congenital cases the foetal type persists, the axis of the organ is perpendicular, and intestine fills the uterovesical pouch. The higher degrees of retroversion are the result of continued intra-abdominal pressure during childhood and youth. Careful figures are given comparing the subjective phenomena in the 798 women with anteversion with those of the 202 women with retroversion. The age at which menstruation begins is practically the same in both classes. Dysmenorrhœa was complained of by 12.8 per cent with anteversion and by 16.3 per cent with retroversion. Patients with retroversion had intermenstrual backache slightly more often. There is little difference as a whole in the character and incidence of symptoms between the two classes. Congenital retroversion with symptoms is usually a part of a general picture of defective development. Surgical treatment has but little scope in these cases.

H. E. Mock² discusses so-called *traumatic displacements of the uterus*. Many

claims for compensation have been based on the assumption that these lesions occur, and the writer shows that these have no basis in fact, quoting a wealth of authority and illustration. Many authorities agree that acute sudden displacements due to trauma do occur, are easily relieved, and do not cause more than a few days of disability; but none give definite reports of trauma causing prolonged or permanent displacement. The claims for compensation are always made on account of prolonged or permanent disability, and this is never due to traumatic retroversion or other displacement. This paper should be remembered by all who are interested in compensation cases.

Essential Uterine Hæmorrhage.—S. H. Geist¹ advocates conservatism in the treatment of the bleeding which has received names such as 'chronic metritis', 'fibrosis', 'metropathica hæmorrhagica', and 'essential uterine hæmorrhage'. No doubt different groups of cases are included under these names, but those specially referred to show two constant findings, one a hypertrophied uterine mucosa, and the other a cystic condition of the ovaries, varying from small atretic follicles to rather large corpus luteum cysts. The ovaries are enlarged more or less up to twice their normal size. The treatment by removal of the uterus, the ovaries, or both, is mutilating, and radiation is regarded as destructive of the ovarian function. The writer recommends **Double Resection of the Ovaries**, a wedge-shaped excision of the cyst-bearing area involving about four-fifths of the medulla and about two-thirds of the cortex. In a number of cases treated by this method, the result has been very satisfactory. [But the radiologists claim that they can cure all these cases, and that it is not essential to destroy the ovarian function.—W. E. F.]

Treatment of Non-malignant Uterine Hæmorrhage by Radium.—E. A. Weiss⁴ sums up the position. He says Radium should be used only in selected cases, such as: (a) Myopathic bleeding of adolescence that does not respond to usual medical and hygienic measures; (b) Small myomata uncomplicated by adnexal disease; and (c) Menorrhagia of the menopause. The dosage depends on the age of the patient and upon the decision to sacrifice or to preserve the reproductive function. When myomata are present, myomectomy in young women, and hysterectomy when the growth is large or complicated, are the proper treatment.

The Present Status of Surgery for Myoma Uteri causing Symptoms.—S. S. Tracy⁵ finds that of all patients who seek advice on account of such fibroids, 30 per cent have either degenerations of the tumour or malignant disease, and 70 per cent have complicated tumours. In women over 40 years of age, only 16 to 18 per cent have simple uncomplicated tumours. It is impossible by any method of clinical examination to determine which are simple and uncomplicated. The treatment of choice is myomectomy under 40 and hysterectomy past this age. Radium may be used in uncomplicated simple small myomata causing bleeding at the menopause; in patients with bleeding after myomectomy; in those who are bad surgical risks; and in those in whom fibroids are small and uncomplicated by any degeneration or infection.

Cancer of the Cervix.—Some remarks by W. P. Graves⁶ give a good idea of the relations of Operation and Radium at the present time. Graves says that before radium came into use, operability depended on the surgeon's estimate of his ability to do a radical operation without killing the patient. A few rash operators, satisfied with a 25 per cent mortality, brought upon the operation undeserved opprobrium; while the timid surgeon with his 10 per cent operability created a feeling of hopelessness regarding the surgery of cancer. Since the use of radium has become general, the question is no longer, "Can we operate without killing the patient?" but is, "Have we, by radical operation, a reasonable chance of curing the patient?" He thus

now considers cases in terms of curability instead of operability, and operates on all cases in which the disease is thought to remain localized. He does not favour pre-operative radiation. The increased difficulty of the operation, septic complications of convalescence, and invariable recurrence of the disease, have led him to abandon the practice. Radiation cannot reach farther than the knife in frankly operable cases. As a preliminary cleansing measure it has no advantage over judicious curetting and cauterization. Post-operative radium prophylaxis is common. Graves does not use it if he feels that he has removed all the disease; if in doubt he does.

In cases in which operation is contra-indicated by heart disease, renal disease, old age, and especially by obesity, comparatively early cases should be treated by radium, and the results in a few years will be most instructive.

So-called border-line cases are relegated to radium, because it is less dangerous to life and, on the whole, produces equal if not better results in comfort and prolongation of life. An exploratory incision is justifiable to determine the exact extent of the disease. Hopeless cases are all radiated, however hopeless, unless fistulæ have formed.

Local recurrence in the vagina after operation is peculiarly amenable to radiation, and there is evidence to show that ultimate cure may sometimes be obtained. Recurrence in glands is probably hopeless; X-ray treatment is the only resource.

REFERENCES.—¹*Jour. Amer. Med. Assoc.* 1922, Sept., 793; ²*Ibid.* 797; ³*Surg. Gynecol. and Obst.* 1923, March, 383; ⁴*Amer. Jour. Obst. and Gynecol.* 1923, Feb., 128; ⁵*Ibid.* 135; ⁶*Boston Med. and Surg. Jour.* 1923, June, 1006.

UTERUS, PROLAPSE OF. (See GENITAL PROLAPSE.)

VACCINATION. (See also SMALL-POX.)

J. D. Rolleston, M.D.

PATHOLOGY.—T. Ohtawana¹ maintains that the immunity acquired by vaccination is not limited to the skin, but is an active immunity of the body as a whole, the grounds for his contention being as follows: (1) Cow-pox virus inoculated into the skin of a rabbit or man not only multiplies at the site of inoculation but also enters into the circulation; (2) Even if the vaccinated site is excised before the formation of pustules, the virus appears later in the blood and multiplies in it; (3) If it is injected into a rabbit's vein, the virus is demonstrable for a certain period without regard to the amount injected; (4) Re-inoculation of cow-pox virus into the skin or testis of a rabbit after previous vaccination of these organs shows that if the skin is immunized the testes are immunized also.

SYMPTOMS AND COMPLICATIONS.—J. M. Ball and N. Toomey² have collected about 80 cases of *vaccinia of the eyelids* from the literature, including one of their own in a girl, age 5 years, due to auto-inoculation. Only 25 per cent were due to vaccinated persons inoculating their own eyes, as in the writers' case, the rest being due to vaccinators, mothers, nurses, and others infecting their eyes from the vaccination vesicles of some one under their care. In view of the degree of scarring caused by primary vaccinia of the skin, the prognosis of secondary vaccinia of the eyelids is usually very good. Severe complications, however, may ensue when the conjunctiva or cornea is involved by secondary extension. Loss of the eye has often been observed, and corneal opacities that interfered considerably with vision have been described. The deformity of the lid may consist merely of a small pale area of thin soft scar tissue with a loss of some cilia, as in the writers' case, or it may consist of marked adhesions binding one or both lids down to the globe.

E. Moulard³ describes a case of extensive *phagedænic gangrene* following

vaccination in a man, age 51, who did not present any signs of alcoholism, syphilis, or diabetes. The outer surface of the left arm, clavicular region, back, and nape of the neck were involved. Suncars of the pus showed the ordinary micro-organisms of suppuration, viz., staphylococci and streptococci. Vincent's spirillum and fusiform bacillus were not isolated. Cultures showed the presence of *B. pyocyaneus*, which Moulard thinks was the causal agent of the phagedænic gangrene. The lesions resisted ordinary treatment for some months, but rapidly yielded to local applications of trioxymethylene in glycerin and polyvalent Leclanche-Vallée serum.

Doré⁴ records a case of *hæmolytic relapsing jaundice* which developed in a sailor five days after vaccination. He attributes the occurrence to a hæmolytic streptococcus or some other hæmolytic agent in the normal flora of vaccinia. Rapid improvement followed intramuscular and intravenous injection of colloidal iron.

H. Nocke⁵ reports a case of *purpura hæmorrhagica* which occurred in a male infant, age 14 months, ten days after successful vaccination, and was manifested by epistaxis, generalized purpuric eruption, and a large quantity of blood in the urine. The blood examination showed: Hæmoglobin, 45 per cent; red cells, 2,552,000; leucocytes, 11,000; polymorphonuclears, 26.5 per cent; lymphocytes, 70 per cent; eosinophils, 1 per cent; transitionals, 2.5 per cent. The blood-platelets were almost entirely absent. The bleeding time was 5½ minutes. Rapid recovery took place without any special treatment.

REFERENCES.—¹*Japan Med. World*, 1923, 1; ²*Jour. Amer. Med. Assoc.* 1922, ii, 935; ³*Thèse de Paris*, 1922, No. 294; ⁴*Bull. de l'Acad. de Méd.* 1922, ii, 181; ⁵*Med. Science*, 1923, viii, 203.

VARICELLA. (See CHICKEN-POX; HERPES ZOSTER.)

VARICOSE VEINS.

• Sir W. J. de C. Wheeler, F.R.C.S.I.

Turner¹ points out that the anatomy of the saphenous opening is such that the fascia lata, which is the outer boundary of this opening, is tense when the patient is standing and lax when in the sitting posture. If the fascia lata is tense, so also must be the sharp falciform edge with its superior and inferior cornua, the latter lying between the superficial and deep venous trunks. The obstruction thus produced may cause a slight degree of interference quite sufficient to overflow the veins, and to cause them to dilate and, eventually, to become varicose. It must be remembered also that the superficial epigastric, the superficial circumflex iliac, and the external pudic vein join the internal saphenous vein at its termination. The flow from these veins is from above downwards, in direct opposition to the flow of blood in the internal saphenous. Turner thinks that it is a wrong principle to excise or obliterate the main trunks of venous return, e.g., the internal saphenous. The operative treatment of varicose veins should have three objects: (1) To excise those veins or group of veins which are causing symptoms; (2) To remove the cause of the trouble; (3) To preserve the internal saphenous, the main channel for the drainage of the superficial system of veins of the lower extremity. The anatomical obstruction on the saphenous opening is relieved by division of the fascia lata from the saphenous opening downwards, and by transplanting the long saphenous vein beneath the fascia, which is then sutured over it. The tributaries which join the internal saphenous and have a flow of blood in the opposite direction are divided and ligatured. The length of vein which should be embedded beneath the fascia varies, but as a rule five or six inches will be sufficient. When the lower half of the internal saphenous in the thigh is tortuous and varicose, it should be excised, and the upper half may then be

treated in the way described. The lateral tributaries should, of course, be preserved, in order to maintain the internal flow. Turner says that when the whole length of the vein is varicose from the saphenous opening downwards, the transplantation beneath the fascia is contra-indicated. In such cases the Trendelenberg operation and excision may be tried, but the prognosis is bad.

Homans,² after an interesting description of the anatomy, physiology, pathology, and etiology of varicose veins, states that ulcer is the most common complication of varicose veins. To establish it an injury plus infection is necessary, but the stage is always set. The first sign of impending ulceration is usually the pigmentation which appears in larger and smaller patches upon the front and inner sides of the lower leg. This is the region of greatest stasis, since the long column of blood reaching to the heart is above it, and there is not the free anastomosis with the deep circulation which is present in the foot.



Fig. 98.—The varicose veins have been emptied of blood.

The appearance of pigment, which is often accompanied by a shiny atrophy, is evidence of the irritation due to poor nutrition. Only a scratch or a blow is necessary to establish an ulcer, for the badly nourished tissue almost inevitably becomes infected. The extent of the ulcer then depends upon the degree of malnutrition and upon the character of the treatment which is used.

DIAGNOSIS.—The appearance of fully developed varix is so unmistakable that only the refinements of diagnosis are important in coming to a decision as to the treatment. Since the blood readily pours down a varicose vein, the simplest test of the loss of its valves is suddenly to lower the leg which has previously been emptied of blood by elevation. This is easily done by placing the patient in a rocking chair, raising the leg as the chair tips back (*Fig. 98*), and asking the patient to stand up as the chair tips forward. The test was

devised by Trendelenburg, the author of the position used so generally in abdominal operations upon the pelvis. The veins, of course, stand out tensely as the patient stands. But there is a very obvious refinement of this test which gives even more information. Before the leg is lowered, pressure is made upon the great saphenous vein in the thigh sufficient to prevent the flow of blood down it. When the patient stands, the vessels remain collapsed below the point of pressure, and fill with a shock when the pressure is removed. This test is most conveniently carried out by passing a short length of gauze bandage about the upper thigh. The ends of the bandage are held as reins are held in one hand in driving. A half twist of the hand gives sufficient constriction, and release is easily made (*Fig. 99*).

Suppose now that, as the patient stands, the constriction is not released but maintained. If then the veins are seen and felt to fill quite rapidly below the constriction, they obviously have not filled with fresh blood from the arterial circulation, since this is a slow process requiring perhaps three-quarters of a minute. Nor have they filled by downflow from above, since the bandage prevents it. Therefore they must have filled from the deep veins by leakage of the valves of the perforators, which normally conduct blood only from without inward. This incompetence of the perforating veins indicates a greater gravity of the condition, and is particularly important in planning the treatment of ulcer. For, if, as sometimes happens, an ulcer lies directly over one of these vessels, and if at operation only the superficial veins higher than the ulcer are removed, the presence of the leaking perforator will continue to lead to stagnation of blood in the region of the ulcer, and failure to cure. However, even in varix uncomplicated by ulcer, the test may be valuable. The lesser saphenous vein perforates the popliteal space. Its branches on the back of the calf may, without showing much enlargement, communicate with the great saphenous. If it is varicose, it may alone be responsible for the filling of the surface veins below the constriction in the thigh. If early filling below the constriction is evident, and varicosity of the lesser saphenous is suspected, the same test can be applied at the level of the knee. If constriction here now checks the filling below, the lesser saphenous is the leaking perforator and must be removed. It is not rare to find recurrences after excision of the great saphenous vein from failure to deal with this vessel.

Now to go back a moment. We have just followed the course of events



Fig. 99.—Demonstration of the constriction test. Note the constricting bandage about the upper thigh and the method of tightening the bandage. The varicose veins remain empty below the constriction at the end of half a minute. (*Figs. 98 and 99 by kind permission of the 'Boston Medical and Surgical Journal'.*)

when the superficial veins fill below the constriction upon lowering the leg, and we have seen that such filling indicates a leak into the surface vessels from the deep. If, on the other hand, the superficial veins remain empty for a half minute or more after the leg is lowered, there is no such leak. We are then dealing with a pure surface varix, and the treatment even in the presence of ulcer is simplified.

REFERENCES.—¹*Guy's Hosp. Rep.* 1923, April, 225; ²*Boston Med. and Surg. Jour.* 1922, Aug. 17, 259.

WARTS.

E. Graham Little, M.D., F.R.C.P.

Howard Fox,¹ following Charles White, has used *Pil. Hydrargyri Iodidi Viridis*, in doses of $\frac{1}{2}$ gr. three times daily (smaller doses for patients younger than adults), with considerable success in the treatment of flat warts. Of 10 cases so treated, 5 were entirely successful within eight weeks, without any local remedies at all, and there were no recurrences in these treated cases. In the unsuccessful cases the treatment does not appear to have been continued for longer than four weeks, which is an insufficient time to test the effects. Several other authors are quoted as being successful with this method of treatment, and the present reviewer can endorse the recommendation of this treatment from long personal experience of it.

REFERENCE.—¹*Amer. Jour. Dis. Child.* 1923, Jan., 55.

WHITLOW, MELANOTIC.

E. Graham Little, M.D., F.R.C.P.

Hertzler¹ reports two cases of this condition, which has so far been very little observed in America. The first, a widow, aged 64, showed an ulceration along the outer border of the left thumb-nail resulting from a slight injury a year and a half previously. It was treated for a year without success, and the nail was then removed. When seen she presented a blue-black granular area occupying the nail-bed from which the nail had been removed. There were no glandular enlargements. The thumb was amputated, and two years after amputation there was no evidence of recurrence. In the second case, a woman, age 54, 'a black spot' the size of a glass-headed pin, under the left thumb-nail, had been noted four years previously. Three months later the nail had been stripped off in the centre, exposing a hard dry surface beneath. Later the remaining portions of the nail also separated, and then the original black spot grew into a tumour like a wart. This was treated with radium, but it became rapidly worse, and she then came under the author's observation. There was no involvement of lymph channels or glands. Amputation of the digit was effected, but sufficient time has not elapsed since the observation for recurrences to be noted. Sections from both cases were obtained, and showed epithelial proliferations, probably beginning with pigmented cells.

The author repeats the warning that radiation, as in most melanotic diseases, is worse than useless.

REFERENCE.—¹*Arch. of Dermatol. and Syph.* 1922, Dec., 701.

WHOOPIING-COUGH.

J. D. Rolleston, M.D.

ETIOLOGY.—H. Barbier and Renard¹ maintain that in a family in which whooping-cough occurs it is not the patient who is liable to spread the disease after the paroxysms have lasted a certain time, but the brothers and sisters who have a cough, even though it does not subsequently assume the characteristic features of pertussis. They relate the case of a child whose brother had definite whooping-cough, while he himself had only a slight cough, which was regarded as an ordinary cold, until cultures of the pharyngeal mucus showed an abundant growth of the Bordet-Gengou bacillus.

· SYMPTOMS AND COMPLICATIONS.—G. Milio,² who reports two cases, states that *whooping-cough in the new-born* is a rare event, owing to the fewer opportunities for infection rather than on account of a congenital immunity due to passage of antibodies from the mother to the foetus. The symptoms are much the same as in older children, except that the catarrhal period is usually short. The average duration of the disease does not exceed a month, or a month and a half at most; but while the duration is shorter, the gravity of the disease is far greater than in older children, owing to interference with nutrition and the frequency of complications, such as bronchopneumonia, convulsions, and spasm of the larynx. Both Milio's cases, age 8 and 10 days respectively, rapidly recovered after intramuscular injections of ether.

G. Mouriquand and J. Barbier³ report a case of severe whooping-cough in a girl, age 7, complicated by *lobar pneumonia* of the left lung. This is a rare complication of whooping-cough and, as in the present case, usually runs a favourable course.

T. Reh⁴ records a fatal case of whooping-cough in a female infant, age 20 months, complicated by *convulsions resembling tetany*. The autopsy showed no evidence of encephalitis, but merely hyperæmia of the meninges and parathyroids as well as bronchopneumonia.

W. Schmitt⁵ relates a case of *transient blindness* following whooping-cough convulsions in a girl, age 2½. The condition is attributed to an extensive hæmorrhage involving the right parietal and occipital lobes. Complete recovery took place after about two and a half months.

Whooping-cough and Tuberculosis.—P. Nobécourt and H. Forgeron⁶ performed the tuberculin cuti-reaction in 37 children, aged from a few months to 9 years, with the following results: In 33 cases, or 89·18 per cent, the reaction was negative; in 2 it was first positive and then negative; and in only 2, or 5·4 per cent, did it remain positive. Positive cuti-reactions are thus rarer in whooping-cough than in apparently healthy children or in those suffering from various diseases, in whom the proportion of positive reactions ranges from 35 to 55 per cent. In answer to the objection that the reactions were negative because the children were not tuberculous, the writers state that in three out of eleven autopsies tuberculous lesions were found, and these three children had given negative cuti-reactions. Whooping-cough, therefore, gives rise to a disappearance of the cuti-reaction, or to tuberculin anergy, which is all the more marked the severer the attack. This anergy—with which are associated changes in the peritracheobronchial glands, caused by pertussis and respiratory infections—favours the development or hastens the evolution of tuberculosis.

DIAGNOSIS.—S. Z. Orgel⁷ has employed a modification of the method introduced by Modigliani and De Villa (see MEDICAL ANNUAL, 1923, p. 504), using a *B. pertussis* vaccine containing 200 million bacilli per c.c. Tests were made in four cases during the incubation stage, all but one of which were positive; 14 in the catarrhal stage, which were all positive; and 7 in the paroxysmal stage, which were all positive. In two control groups of 30 children, 15 of whom were suffering from acute or chronic bronchitic coughs, and 15 from various complaints, the reaction was negative. On the other hand, E. A. Riesenfeld⁸ did not obtain any specific reactions by the use of Bordet-Gengou bacilli injected intracutaneously. Positive and negative results alike were obtained in children having the disease, in children who were immune, and in children developing the disease after the injection. T. G. Hull and Nauss⁹ also came to the conclusion, as the result of numerous trials of the method, that preparations of *B. pertussis* could not be used intracutaneously for the diagnosis of whooping-cough.

C. Thiemann,¹⁰ discussing the diagnostic value of blood findings in whooping-

cough, remarks that an otherwise atypical case presented a typical blood picture, viz., 42,100 leucocytes, of which 76 per cent were lymphocytes, 19 per cent polymorphonuclears, and 5 per cent mononuclears. On the other hand, in a case of undoubted pertussis, the blood picture was not characteristic, owing to the presence of a polymorphonuclear count of 52 per cent in a total leucocyte count of 31,900. Thiemann has seen a number of other cases of clinically typical whooping-cough in which the blood picture was normal.

PROGNOSIS.—An illustration of the favourable course of whooping-cough in private practice is given by K. Ochsenius,¹¹ who states that out of 870 cases which he has treated during the last twelve years, he has lost only 8—a mortality of less than 1 per cent. On the other hand, at the Heidelberg Children's Clinic the mortality among 200 cases observed by K. Gottlieb and B. Möller¹² was about 30 per cent.

PROPHYLAXIS.—R. Debré¹³ has recently employed the prophylactic injection of *Convalescent Serum*, as several investigators, including Bordet and Gengou, have shown that the amboceptor content of pertussis serum, which is low at the beginning of the disease, increases towards the third week, and often remains high for a long period. He uses a mixture of several serums (4 to 8) collected under aseptic precautions from patients who had had the disease for five weeks, and keeps it in the ice-chest for several days to avoid the risk of syphilitic contamination in cases of failure to detect syphilis clinically or an error in the Wassermann reaction, which should always be performed, and also to prevent inoculation of *B. pertussis*. The doses for children under three years of age is 2 to 3 c.c. Of 40 children who had been exposed to infection and received prophylactic injections, 31 entirely escaped, 6 had a remarkably mild attack of whooping-cough, and only 3 had an ordinary attack.

As the result of their examination of numerous children and adults for the Bordet-Gengou bacillus before and during the paroxysmal stage of pertussis, H. Barbier and Renard¹⁴ have come to the conclusion that whooping-cough patients are isolated for too long a period. In most cases they cease to be contagious after three weeks. They should therefore be allowed to return to school one month after the onset of the disease, as is the practice in Denmark.

TREATMENT.—T. Izod Bennett¹⁵ states that nothing is more important in the treatment of whooping-cough than the *Diet*. It is best to give food about ten minutes after a paroxysm, when it will usually be comfortably retained. In the case of babies, the food should be given after the first paroxysm occurring subsequent to the normal hour of feeding. If vomiting and loss of weight are taking place, the intervals between the feeds should be decreased, and the bulk of the food at each feed be diminished. With older children, large meals must be avoided, and fluid food such as milk, soups, etc., be given between meals, the period following a paroxysm being chosen for each meal.

Bennett recommends *Vaccine treatment*, especially as an aid to the prevention of pulmonary complications, and therefore advocates a mixed vaccine containing the Bordet-Gengou bacillus together with strains of various organisms commonly found in the pulmonary diseases of children, the composition of the vaccine being as follows:—

Bordet-Gengou bacillus	250 million	<i>B. septius</i>	..	..	20 million
Pneumococcus ..	125 "	<i>Staphylococcus aureus</i>	..	250 "	
<i>M. catarrhalis</i>	50 "	<i>Streptococcus</i>	..	20 "	
<i>B. Friedländer</i>	50 "	<i>B. influenzae</i>	..	150 "	

The dose for a child of 5 years should be 0.1 c.c., to be doubled every four days, unless a violent reaction occurs. In a child severely ill the dose should not exceed half of the above.

As regards **Injections of Ether** (*see* MEDICAL ANNUAL, 1921, p. 514; 1922, p. 498; 1923, p. 504), as they are very painful, Bennett recommends that they should not be used, except in cases where there is chronic paroxysmal coughing without adequate cause, and an effort to break a vicious circle is necessary.

H. Méry and L. Girard¹⁶ report a case of severe pertussis in an infant, age 2 months, treated by intramuscular injections of the **Blood of the Mother**, who had contracted the disease a fortnight before the infant, whom she had infected: 20 c.c. were taken from a vein, placed in a tube containing 1 c.c. of a 10 per cent solution of sodium citrate, and 5 c.c. of the mixture was then injected. Rapid recovery took place.

Lesné and Petot¹⁷ report their experience in the treatment of whooping-cough with **Convalescent Serum**. Though it did not appear to have any influence on the number and intensity of the paroxysms or the duration of the disease, the serum had an excellent effect on the general condition and bronchopneumonia. Children, age from 18 months to 3 years, with extensive bronchopneumonia accompanied by high fever, dyspnoea, and cyanosis, rapidly improved after three injections of 10 c.c. of the serum.

After alluding to the **Abdominal Belt** introduced by Kilmer in 1904 (*see* MEDICAL ANNUAL, 1905, p. 459), P. Luttinger¹⁸ states that he has substituted a less cumbersome and cheaper contrivance, consisting of a cotton bandage 5½ yards long and 3 inches wide for infants less than 1 year, while older infants take a 4-in. bandage, and those over 2 years a 5-in. bandage with tapes. The bandage can also be obtained in 6-in. to 8-in. widths according to the age of the child. Luttinger found the bandage very serviceable in all stages of the disease. When applied early it lessened the number of vomiting spells, possibly by pressure over the vagus, and thereby contributed to better nourishment and resistance to infection.

T. P. Hall¹⁹ recommends **Lavage of the Stomach** twice a day before meals. Two quarts of water at 100°, containing 20 min. of lysol, are used alternately with water containing 3 or 4 drachms of sodium bicarb. Immediate relief is obtained. After the first day's treatment the spasms lose most of their intensity, and if the treatment is begun early it is sufficient to end the cough.

H. I. Bowditch and R. D. Leonard²⁰ have treated 26 cases, age from 3 months to 40 years, in different stages of whooping-cough, with **X Rays**. Each patient received three or four applications at intervals of two to three days, the dosage being regulated according to the patient's age. The total amount of X ray given to any one patient was well under an erythema dose. A small percentage recovered after two or three applications covering a period of six days, the spasms and whoops entirely disappearing; about 70 per cent showed a gradual diminution of the paroxysms; and about 10 to 15 per cent were not relieved. Although the evidence is not conclusive, the writers feel that X rays given at the present time may be of more value in the treatment of whooping-cough than any other method.

F. Parry²¹ has treated 30 cases by insufflation into the nostrils four times daily of lactic acid bacilli in the form of **Lacteol**. Within twenty-four hours the puffiness of the face disappeared and vomiting subsided. The whoop invariably ceased in from two to eight days. Parry suggests that the effect is of the nature of a protein reaction.

K. Ochsenius²² disputes the view held by Lederer (*see* MEDICAL ANNUAL, 1922, p. 498) and others that the success of his method of painting the throat with a 2 per cent solution of **Silver Nitrate** is due to suggestion only. Although he admits that an element of suggestion is necessary in every whooping-cough cure, especially in the later stages, there is a great difference between a remedy that acts purely by suggestion and one of which suggestion is only a part.

Unlike Lederer, Ochsenius has obtained the best results in young infants who do not react to suggestion. The rationale of painting the throat with silver nitrate is that the drug acts as a secretory astringent.

In urgent cases of convulsions in which no blood can be obtained by venesection, Klotz²³ recommends **Section of the Radial Artery** as suggested by Noeggerath. He has found the method effective, and by no means so alarming as it might seem. There is no likelihood of the child bleeding to death. Not infrequently only bluish-black blood issues from the severed artery, and shortly afterwards the flow stops. Gottlieb and Möller¹² also derived considerable benefit from this method or from **Puncture of the Sinuses** in the treatment of convulsions.

REFERENCES.—¹*Bull. et Mém. Soc. méd. Hôp. de Paris*, 1922, 1592; ²*Pædiatria*, 1922, 297; ³*Lyon méd.*, 1923, 76; ⁴*Bull. Soc. de Péd.*, 1922, 261; ⁵*Klin. Woch.*, 1923, 1413; ⁶*Arch. de Méd. des Enf.*, 1922, 394; ⁷*Jour. Amer. Med. Assoc.*, 1922, ii, 1508; ⁸*Ibid.*, 1923, i, 158; ⁹*Ibid.*, 1840; ¹⁰*Monats. f. Kinderheilk.*, 1921, 471; ¹¹*Ibid.*, 1922, 60; ¹²*Jahrb. f. Kinderheilk.*, 1922, ii, 222; ¹³*Bull. de l'Acad. de Méd.*, 1923, i, 348; ¹⁴*Paris méd.*, 1922, ii, 531; ¹⁵*Lancet*, 1923, i, 197; ¹⁶*Bull. et Mém. Soc. méd. Hôp. de Paris*, 1923, 243; ¹⁷*Ibid.*, 323; ¹⁸*Jour. Amer. Med. Assoc.*, 1922, i, 1536; ¹⁹*N. Y. Med. Jour.*, 1922, ii, 158; ²⁰*Boston Med. and Surg. Jour.*, 1923, i, 312; ²¹*Lancet*, 1923, i, 78; ²²*Monats. f. Kinderheilk.*, 1922, 60; ²³*Munch. med. Woch.*, 1922, 711.

WORMS, INTESTINAL. (See INTESTINAL WORMS.)

WRITER'S CRAMP. *Sir James Purves-Stewart, K.C.M.G., C.B., F.R.C.P.*

Of all the occupational spasms, writer's cramp is by far the commonest. Since the days of Duchenne, of Boulogne, several varieties of symptoms have been recognized, including: (1) The spastic form, characterized by muscular spasm, whether painful or painless; (2) The tremulous form, characterized by tremors during the act of writing; and (3) The paralytic form, characterized by temporary disability to continue the attempt. These three varieties of symptoms may be intermingled in any individual case. Whatever be the variety of disability present, it is characterized by the fact that it occurs only during the act of writing. For all other actions executed with the affected limb, the hand remains powerful. This fact excludes at once any peripheral muscular weakness as the primary causal factor in writer's cramp. The malady is essentially of central origin, and any accidental peripheral conditions, such as inflammation of tendons, joints, muscles, etc., can only act as what Macé-de-Lapinay has termed an 'irritative thorn' (*épine irritative*) in the mental state of the patient. Moreover, such peripheral irritants as a rule are absent. It is further to be remarked that writer's cramp supervenes, not when an individual is learning to write, but when he is already expert at writing, and often when his livelihood consists in exercising that expert action.

In the treatment of writer's cramp, innumerable drugs have been tried, none of them with any real benefit. Rest alone does not cure the condition, for when the patient begins to write again after weeks or months of simple rest, his cramp at once reappears. A more successful method has been to discontinue writing with the right hand and learn to write with the left, thereby employing the cortical centre on the right side of the brain in place of the wearied left-sided cortical centre. Local treatment to the muscles of the affected hand, such as massage or faradism, has achieved but little, whilst surgical intervention in the form of tenotomy of the cramped muscles has been a conspicuous failure.

The condition being a cortical one, associated with excessive tonus of the flexor and adductor muscles, together with hypotonus of the extensors and abductors, it seems more reasonable to attack the malady by trying to increase the tonus of the hypotonic muscles and leaving the hypertonic muscles alone.

For this purpose a special apparatus was devised many years ago, whereby the pen was grasped by throwing into action, not the flexors and adductors of the fingers as in ordinary writing, but the extensors and abductors. Based on a similar principle, Kouindjy,¹ of Paris, treats his cases by directing special attention to the **Hypotonic Muscles**, which are **Massaged** to the exclusion of the hypertonic muscles. The treatment begins with superficial and deep effleurage, followed by circular and deep pressure, to which are added percussion, whether by finger or hammer, and finally vibration treatment. This massage is supplemented by active exercises designed to strengthen the hypotonic antagonists of the spastic flexors and adductors. Exercises which would strengthen the spastic muscles are avoided.

The following **Exercises** are therefore carried out for a period of a quarter to half an hour daily, during the course of two to four months, the patient meanwhile being under the personal supervision of the physician, who thereby controls the treatment and adds an important element of curative suggestion.

In the first exercise the patient's forearm is placed on a stool or table, pronated, but so as to leave his fingers completely free. To the phalanx of any one of the fingers is tied a piece of string or ribbon, to the other end of which is fastened a small receptacle such as a little pail or basket, a purse, or a bag. In this receptacle are placed various weights in succession, beginning with 50 cgrm., later increasing to 75 or 100 cgrm. The patient on command is made to raise the weighted finger as high as possible by contracting the extensor, and then to lower it again, likewise on command. This exercise is repeated five, ten, or fifteen times. The string is then tied to the adjacent phalanx, to another finger, or even to two fingers at the same time, and so on.

The second exercise consists in stretching out the arm and hand as far as possible and placing on the dorsal aspect of the fingers a small object such as a coin or small rubber ball, a disc of leather, or a small stick. The patient's arm being in complete extension, he is requested to toss up the article laid on the fingers and to catch it again on the dorsum of the hand. This is repeated from two to four times, and concludes with tossing it up again and catching it on the palmar surface.

The third exercise consists in placing a long stick or cane transversely across the dorsal surface of the fingers, with the arm completely extended as before. Then the cane is made to roll several times up and down the dorsum of the hand, near its ulnar side. Finally, after four or five turns, the cane is grasped with the palm.

These preliminary exercises are for the purpose of preparing the muscles of the affected hand for the re-educative exercises of writing. Kouindjy teaches the patient to write slowly and deliberately with frequent intervals of rest, meanwhile placing all the previously spastic muscles at rest during the act of writing. This is accomplished by **Inverting the Hand**, so that the re-educated writing is accomplished mainly by the extensors, in contrast to ordinary writing, which is executed by the flexors. The patient sits at a low table with his right forearm parallel to the front edge. He places his hand down on its dorsal surface, holding the pen between the thumb and the palmar surfaces of the first two or three fingers. The point of the pen thus points backwards over the dorsum of the hand. The left hand moves the paper as required. The ink-pot is within reach of the right hand, so that the patient has only to extend his hand to have the pen dip into the ink-pot, two-thirds filled with ink. On command he makes a straight stroke with the pen: then, again on command, he dips the pen in the ink, and so on. Later, when he has learned to trace straight strokes, he is promoted to writing single letters, always on

command, and then to syllables, words, and short sentences. The repeated rests are for the purpose of obviating fatigue of the extensor muscles, unaccustomed as they are to tracing consecutive letters in the act of writing, and also in order to produce frequent movements of extension and flexion of the fingers and wrist.

Such re-educative writing exercises are also carried out at home by the patient, in the form of set tasks lasting not more than twenty or thirty minutes a day.

When the patient has mastered the process of writing with inverted hand, he is then allowed to write in the ordinary way from time to time, on condition that he does so slowly and deliberately. Thus the patient acquires the ability of regularly employing two kinds of writing, with the hand inverted and in the ordinary way. The advantage of this plan is manifest even after conclusion of the treatment, for whenever he feels a threatening of the characteristic spasm during the act of normal writing, the re-educated patient turns his hand over and continues writing with the hand inverted. As soon as the cramp of the flexors passes off, he resumes the ordinary mode of writing. Kouindjy claims encouraging results by the foregoing plan. One of his cases has remained well for eighteen years. Unfortunately the malady occasionally tends to relapse, so that the re-educative course of exercises has to be resumed from time to time. He claims, however, that treatment for one or two months is sufficient to bring complete relief again.

REFERENCE.—¹N. Y. *Med. Jour.* 1922, Nov. 15, 556.

X-RAY DIAGNOSIS. (*See also* ELECTROTHERAPEUTICS; RADIOTHERAPY.)

C. Thurstan Holland, Ch.M.

Woodburn Morison¹ describes a new step in the development of radiology in a paper which explains how, along with Professor Stopford, a room was equipped in the anatomy school of the Manchester University for X-ray work in the department. Morison was added to the staff as a lecturer, and he outlines his scheme of lecture-demonstrations which is now an integral part of the routine teaching of anatomy. This new departure has been followed by a similar scheme at University College, London, where the anatomy school has been very fully equipped with an X-ray room and plant. It is certain that in the future, as a result of Morison's pioneer work, all departments for the teaching of anatomy to medical students will necessarily be organized so as to include teaching from the radiological standpoint.

For the sixth Silvanus Thompson Memorial Lecture Thurstan Holland² took as his subject "The Influence of X rays on Diagnosis", and, following an introduction in which early X-ray work is described, showed the extraordinary influence which X rays have had in establishing accuracy in diagnosis. The fact is emphasized that this influence is not yet altogether realized, even by medical men. After a short reference to bone conditions, injuries and diseases, and to opaque foreign bodies, the development of the X-ray diagnosis of kidney and ureter stones is discussed somewhat fully, and it is shown that the modern surgery of the kidney owes its development and present position almost entirely to the work of radiologists, and entirely to X rays. The accuracy and reliability of X-ray diagnosis are such that in a series of 5000 examinations no stone had been found by operation the shadow of which had not been shown by X rays: mistakes of interpretation must occasionally occur, but, with good technique, stone shadows should for practical purposes always show. The rest of this paper deals largely with intrathoracic diseases and with the gastro-intestinal tract; it covers a large amount of ground, and indicates very clearly the scope of radio-diagnosis and its development. With this paper,

PLATE L.

STONES IN BOTH KIDNEYS

(POTTER-BUCKY DIAPHRAGM)



J. H. Mather

PLATE II.

GALL-STONES

(POTTER-BUCKY DIAGRAM)



C. Thurston Holland

PLATE LII.

X RAY LOCALIZATION OF SPINAL LESIONS BY SICARD'S METHOD



Fig. A.—Intradural tumour.
W. L. H. C. 11 1457 11. 125



Fig. B.—Extradural tumour.



Fig. C.—Fracture of 1st lumbar vertebra.

C. Thoden Holland

PLATE LIII.

BARIUM FOOD ARRESTED BY A PIECE OF MEAT STUCK
IN THE ŒSOPHAGUS



C. Thorslau Holland

showing the extraordinary importance of X-ray work, should be read Barclay's³ description of the new X-ray department of the Manchester Royal Infirmary. This paper is illustrated with plans and with photographs of many of the rooms and of various pieces of apparatus: it deals with general requirements, equipment, and the staff very fully. The question of adequate protection for operators and patients is discussed, and an interesting feature is the barium plaster walls of the rooms. Great stress is laid upon what is called 'the demonstration room'. This room alone is considerably larger than the total ground floor of many X-ray departments, and it is fitted with an apparatus designed to afford a class of students an opportunity of seeing cases fluoroscoped, with viewing boxes for the different-sized negatives, with a lantern for showing slides, and with a platform for lecture purposes. There is no doubt that for teaching purposes, and for the demonstration of cases, such a room is required in the X-ray department of every teaching hospital. The method of using barium for plaster walls is described by Barclay⁴ in a short note in which both the composition of the mixture and the way to apply it are indicated. [Since this note appeared, however, further tests have shown that the suggested mixture is not as X-ray opaque as it was thought to be, and a much larger proportion of the barium salt is required.—C. T. H.]

The Potter-Bucky Diaphragm.—This piece of apparatus, referred to in the last two MEDICAL ANNUALS, has, on further experience, proved its great value in diagnostic work, and it is evident that it marks a great advance in X-ray technique. Practically all the papers concerning it and its uses have appeared, during the past two years, in various journals published in the United States; but Fildes⁵ in England relates his experiences with various makes of this apparatus in an illustrated article. It is not only in bone work that it is useful: it is invaluable as an aid to showing the foetus in utero, and in kidney and gall-bladder work. It is possible to include the whole area of kidneys, ureters, and bladder on one large negative, but probably it is safer to take two films, one more directed to the kidneys and the upper abdomen, and a second directed to the pelvis and lower abdomen. *Plate L* shows the large area covered, and also stones in both kidneys. *Plate LI* shows a collection of gall-stones in the gall-bladder in a case referred as for kidney examination only. Four plates of the whole stone area taken by the old compressor method showed no renal stone, and the very slight and blurred shadow caused by the gall-stones would probably have been overlooked had not the film taken with the P.B. diaphragm been exposed. On this, and notwithstanding that the radiograph was taken through from before back, the gall-stones are plainly seen. The diagnosis, made entirely from the X-ray examination, was confirmed by operation. Further experience of gall-stone work has confirmed the value of the apparatus for this class of case.

A short note on the technique employed, for which, with slight modification, we are indebted to the X-ray staff of St. Thomas's Hospital, may be of assistance to those commencing to use the diaphragm. The two radiographs reproduced were taken in the following way: A large transformer; an 8-in. Leviathan gas tube; the spark-gap of the transformer set at 8 in.; the amount of current passing through the tube from 20 to 25 ma.; distance of anti-cathode to top of diaphragm 28 in.; filter of 1 mm. aluminium; speed of travel of grid about 12 seconds (it is not important to set this speed at about the actual time of the exposure; it should be set at a speed well above this, and this ensures a good margin of time during which the exposure can be made); an automatic cut-out switch in the circuit set to the actual exposure time; patient lying flat on the back (for kidneys), with abdominal compression by means of a band, the tube being centred over the umbilicus; exposure

2 to 5 seconds according to the size of the abdomen. The patient is told to take in a breath, then to let it all out, then to close the mouth and stop breathing; immediately this is done the starting string is pulled, the grid starts moving, the bell rings, and then—and not till then—the switch is thrown in; the exposure is made automatically, with ample time to spare before the second bell rings. Doubled screened films are used, and these are developed by the tank method in about five minutes. As regards exposure, in the case of a thin abdomen as little as 1 second is quite sufficient, and the exposure can be varied up to 5 or 6 seconds, which appears to be ample even for very large abdomens. Additionally with the latter the tube may be slightly higher in vacuum, and more current may be passed through it, say up to 30 ma.

A newer form of diaphragm, spiral in type, has been constructed by Akerlund.⁶ This appears to be of a simpler design, and can be used easily in any position of the patient. In a second paper by the same author⁷ two of the resulting radiographs are produced which compare quite favourably with those, from the Potter-Bucky diaphragm. It seems to be quite probable that this form of diaphragm may come into general use.

Spinal Lesions.—Sargent²² has tried Sicard's method for the X-ray localization of spinal lesions in several cases; two of tumours and one of fracture are illustrated. The method is as follows: A small quantity, between 1 and 2 c.c., of *lipiodol* is injected into the spinal theca through a suboccipital puncture, the patient being in the sitting position. The *lipiodol* sinks slowly downwards and is arrested at any point of occlusion of the spinal theca, and thus the upper limit of a tumour can be accurately demonstrated by a radiograph. Similarly it should be possible by injecting the fluid through a lumbar puncture to map out the lower limit of a tumour. The great value of this new method of X-ray diagnosis is obvious: the localization must be more accurate than that which can be arrived at by any other means. *Lipiodol* is an oily fluid consisting of 'huile d'ouillette' containing about 40 per cent of iodine, and is very opaque to X rays. Huile d'ouillette is official in the French Pharmacopœia, and is made from the seeds of *Papaver somniferum*, but contains no narcotic or alkaloid. (See Plate LII, which is from the X-ray Department of St. Thomas's Hospital.)

Œsophagus.—Guthrie,⁸ in a paper on meat and fish bones impacted in the œsophagus, lays stress upon the importance of an X-ray examination. Added to this paper is a note by Thurstan Holland on the X-ray technique which he employs in the diagnosis of *non-opaque* impacted foreign bodies, and full details of this method are given. Guthrie is of the opinion that the X-ray findings are quite reliable, and that in the positive cases, i.e., the cases reported as positive, he always found the foreign body at the site indicated (Plate LIII). Bearing on this same subject, Iglauer⁹ relates a number of unusual œsophagus cases, and illustrates three in which non-opaque foreign bodies were diagnosed by X-ray examination.

Stomach and Intestines.—

Stomach.—Barclay¹⁰ has an interesting paper on the "Normal Stomach" which is illustrated with a number of photographs of plaster models which he has made to demonstrate the different appearances of this organ. A knowledge of the limits of normality is so essential to the interpretation of X-ray findings that it is somewhat disconcerting to find that the author states that "the normal stomach has no definite form". In this paper there is a good deal written concerning the bearing of the musculature of the stomach on its shape and condition, and much stress is laid upon the importance of the oblique band of muscle fibres. Barclay¹¹ has also written on "The Function of the Muscles of the Stomach, with an account of some Electrical Experiments".

In this paper are described the results of experiments by which attempts were made to test the *reactions* of various parts of the stomach wall by electrical methods during the course of an operation upon a case of duodenal ulcer. It is claimed that the oblique band of muscle fibres could be made to contract entirely by itself when the olivary-pointed electrode was applied to the lesser curvature in its upper third. It was also noted that on stimulation over the peritoneal surface of the duodenal ulcer, without any local response, an incisura appeared in the lower third of the stomach such as would give, on the screen, the hour-glass appearance so often seen in connection with this pathological condition.

Gilbert Scott¹² discusses the general methods for the X-ray examination of the stomach, and contrasts the results obtained in general terms. His paper is a plea for the systematic method of *radioscopic palpation* as carried out by himself, and which he differentiates altogether from the more or less haphazard screen palpation used by so many workers. He considers that anything which can be shown on a radiograph can be seen on the screen, and that many lesions discernible on the screen cannot be recorded on plates, which latter are merely of use as records. [This paper is valuable as showing the scope of properly planned and routine screen examination, and the success with which it can be carried out; but probably most radiologists, and certainly most physicians and surgeons, prefer to have the more positive evidence of a plate or plates, and this especially when operative procedures are to follow.—C. T. H.]

Peristalsis.—In a paper entitled "New Light on Gastric Peristalsis", Alvarez¹³ describes the results he has obtained by means of an apparatus he has devised which enables him to get 'electrogastograms' of the stomach and intestine; the paper is illustrated by a number of charts. Two of the chief results seem to be that (1) an area exists on the lesser curvature next to the œsophagus which acts as a pacemaker for the stomach contractions, and (2) that just as in the heart, so in the stomach, we find blocks of short or long duration.

Forssell¹⁴ contributes a long and important paper, beautifully illustrated, which deals with the *mechanism of movement of the mucous membrane* of the digestive tract. It is the result of a long series of observations, and is illustrated with both photographs and radiographs. The author seems to have proved that without doubt the folds of the mucous membrane of the colon, as well as those of the stomach, duodenum, and small intestines, are not modelled by a contraction of the muscular coat only, but by autonomous appropriate movements of the mucous membrane; that the muscularis mucosæ forms the special contractile organ of the mucous membrane, and is able to displace it in all directions by means of transverse, longitudinal, and oblique fibres. This knowledge that the folds of the mucous membrane do not consist of passive structures, but represent a momentary state of movement, must therefore involve a new appreciation of their function.

Rendich¹⁵ has made an X-ray study of the gastric mucosa in normal and pathological states, and gives an account of the technique he employs, stress being laid upon the preparation of the barium mixture used. His general idea is that a careful study of the rugæ as shown by barium food may be of considerable value in arriving at a correct diagnosis when an X-ray examination by the usual contour method—that is, the stomach filled with the usual meal—is not conclusive.

Achylia Gastrica.—Crane's¹⁶ paper on the X-ray aspects of achylia gastrica—this term being taken to mean an established chronic disease of the stomach characterized by the persistent absence of free hydrochloric acid in the stomach contents during the whole of the digestive cycle—is based upon the study of 1000 cases. This condition is of importance to the radiologist on account of

its frequency, its association with pain, and its liability to produce X-ray findings pointing to a duodenal ulcer.

Enteroliths.—Broadman¹⁷ draws attention to the possibility of this condition being the cause of obscure abdominal symptoms, and one which should be remembered by radiologists. He narrates and illustrates such a case, and shows how it is possible to obtain suggestive X-ray findings not only of an enterolith but also of its exact position in the bowel.

Pneumoperitoneum.—Sante¹⁸ draws attention to the use of this method as an aid to the exact diagnosis of obscure subdiaphragmatic conditions, and cites and illustrates by means of radiographs two cases. In one of these it was shown that no subdiaphragmatic abscess was present, and operative procedures were modified in view of this knowledge; in the other a definitely early and unsuspected inflammatory process in the subdiaphragmatic region was discovered. This paper also deals with other conditions which occur in this region in which the production of a pneumoperitoneum may often be the deciding diagnostic factor. Carelli,¹⁹ in an extensive paper, summarizes his experiences of over 800 cases of pneumoperitoneum. The technique is gone into with regard to all detail, and a not unimportant part of this is the examination table used. This is designed so that, without moving the patient, the X-ray examination can be made in any desired position.

The Pathological Gall-bladder.—Recognizing that although it is often possible to show a gall-stone, or gall-stones, and to arrive at a correct diagnosis, nevertheless many such stones cannot be shown, George²⁰ has worked out a process of X-ray examination which enables him in the large majority of cases to get definite X-ray findings justifying a diagnosis of the presence of a pathological gall-bladder. The underlying principle is that a normal gall-bladder does not cause pressure on barium food in the stomach or duodenum, whilst, on the other hand, pressure deformities of a certain kind are produced by a pathological gall-bladder.

Kirklín²¹ has also done a considerable amount of work on similar lines, has confirmed George's results, and has achieved great success. His paper is illustrated by numerous radiographs similar to those of George. In a study of 712 consecutive cases, gall-bladder trouble, with or without stones, was reported in 251, and of these, 214 were operated upon. The X-ray findings were confirmed in all but 14 cases, or in about 93·5 per cent. This paper gives a good description of the necessary technique.

The Kidneys.—Thomson-Walker²² discusses the relation of *calcified abdominal glands* to urinary surgery. (*See URETER, DISEASES OF.*) The same author,²¹ in a paper illustrated by many radiographs, discusses the importance of *pyelography* generally in the accurate diagnosis of diseases of the urinary organs. The technique is described in detail, and although sodium bromide solution is fairly satisfactory, it is pointed out that it is irritating to the bladder, and should not be used in anything beyond a 20 per cent solution. The author is also of opinion that this method of examination is not one which should be used by 'the occasional dabbler in urology', that experience in the catheterization of ureters is a necessity, and that the examination *must* be carried out without a general anæsthetic. The paper goes on to discuss the various uses of pyelography and the points which are of value, and which can be relied upon for the purposes of diagnosis. Again the great value of the lateral X ray is insisted upon.

An illuminating paper is that by Nichols²³ on important points in the technique of X-ray examination of the urinary tract. In this paper the author advocates the use of the Potter-Bucky diaphragm for kidney examination, and he describes his methods. Two films are exposed; for the first the

crest of the ilium is placed one inch above the centre of the film, and for the second one inch below; these will give a complete view of the whole kidney, ureter, and bladder areas. He makes some interesting comments on the examination of the ureters, and a radiograph is reproduced showing a stone in a ureter in which the opaque catheter, also in the ureter, was a considerable distance from the stone shadow, due to the fact that the ureter was a good deal dilated. It is of interest to note that the author makes no preliminary preparation for the first general examination. He states that castor oil is not used, because it produces so much gas in the bowel. Heaney²⁸ narrates a number of cases, and shows radiographs which illustrate methods of diagnosis in renal surgery; his paper is well illustrated. Without there being anything especially new, some of the cases referred to are of interest, and generally support the author's thesis that in almost every case pyelography will contribute some fresh details to the investigation of a case, and be of assistance in deciding upon the line of treatment and the planning of any necessary operation.

A very interesting paper is that by Crabtree and Shedden²⁷ entitled "The Radiologist and the Urologist in the Diagnosis of Renal Disease", and written from the point of view of the urologist. The writers lay down the law that in an X-ray examination of the kidneys, however good the plates may be, they are quite unsatisfactory unless the kidney outlines are shown, and the technique should be such that the persistent absence of a kidney shadow should mean one of four possibilities: either a nephrectomy has been done, or there is a congenitally small kidney, a congenitally malposed kidney, or a hydronephrosis.

A rare case of *kidney stone* is reported by Renck,²⁸ and is illustrated by some pretty radiographs and drawings. The exact diagnosis was made difficult by the fact that in the right kidney there were a hundred faceted shadows of equal size and of typical gall-stone appearance. Pyelography was contraindicated, and the correct diagnosis arrived at from radiography in various lateral positions.

Perirenal Inflation.—Chevasse²⁹ discusses a year's experience of perirenal inflation (Carelli's method). He considers the technique simple but the results often unsatisfactory. He also considers the image obtained by this method to be frequently difficult to interpret and no better than an ordinary radiograph.

The Diaphragm.—An important paper by Morison,³⁰ in which there is much original observation and research, deals with the *elevation of the diaphragm and unilateral phrenic paralysis*. It begins with a few very interesting historical notes, chiefly with regard to the original writings of J. L. Petit, who first described and named a case *eventratio diaphragmatica*. Originally a pathological description, by radiology these can now be observed and diagnosed during life. Six cases, illustrated by some fine radiographs, are used by the writer as the basis of his observation, and it is suggested that these cases are much more common than is usually supposed. The diagnosis is based on the elevated diaphragm forming an unbroken bow-line in the chest, and showing reversed movement in respiration. These are the two cardinal signs; others which are sometimes important are variable.

The Heart.—Knox³¹ discusses the whole question of cardiac diagnosis in a survey of the development of physical methods. The larger part of this paper is an account of some of the older methods of X-ray examination, such as ordinary radioscopy, orthodiagraphy, teleröntgenography, and so on. Forsell's method and special apparatus for orthodiagraphy are fully explained and illustrated, as also is the method of examination advocated by Vaquez and Bordet, and the heart-measuring device of Morison and White. Finally, the

author describes the apparatus which he has devised himself for the production of X-ray cardiograms; this is illustrated, and a number of these cardiograms are reproduced. The paper is an admirable survey of all that has been done up to the present, and additionally it indicates the lines upon which this work may be still further advanced.

Bardeen,³² in his paper on the estimation of cardiac volume by radiography, first discusses the value of this method of determining the size of the heart, and refers to work on the hearts of healthy athletes. He goes on to discuss very fully the details of technique, and considers that the X-ray examination is best conducted with the patient in the sitting position and leaning forwards against a tilted plate-holder. The rest of the paper is given up to the methods of determining the size of the heart from the radiographic picture, and his suggestion concerning a standard for measurement and comparison. Delherm and Chaperon³³ have made some interesting observations upon the median cardiovascular X-ray shadow as seen from the front, and, after pointing out that different authors are by no means in accord as to the cause of the various shadows, they describe their own research work, which was undertaken with a view of deciding once and for all some of the more important X-ray points. Many diagrams and radiographs are used to illustrate this paper, and the findings are of considerable importance: not the least important is that they appear to have proved that on the right side the arch of the aorta takes no part in the outline of the X-ray shadow.

Calculus Pericarditis.—A case of calculus pericarditis is recorded by Amundsen,³⁴ the radiograph of which is reproduced. The diagnosis was made entirely from the X-ray appearances. A full description of another case, also discovered during life, is given by Case,³⁵ who also records the literature, from which it appears that twelve such cases have been discovered by radiography. The etiology is discussed, and the X-ray appearances are described.

Bullet in the Heart.—Swearingen³⁶ reports a case of a bullet in the heart in which the patient recovered, and six months after the accident was able to earn his living at work which meant moderate manual labour. He was apparently in the best of health.

Pericardial Effusion.—Salmond³⁷ records a very extraordinary case in which, on making an X-ray examination of a case of pericardial effusion which had been tapped previously several times, he found after the last tapping a pneumopericardium. What was of more importance in addition, above the free fluid in the pericardium, the shadow of a definite tumour was made out. As a result of this finding an operation was performed and a large cyst, containing 40 oz. of fluid, and adherent to the upper left aspect of the pericardium, was successfully removed. Two and a half years after the operation the patient was quite well. Some excellent radiographs indicate various stages in this case. The author suggests that it is possible that the intentional introduction of air or other gas into the pericardium may have to be considered in certain cases.

The Lungs.—

Phthisis (see also TUBERCULOSIS).—Stanley Melville³⁸ draws attention to the now admitted fact that not only slight but even extensive tuberculosis of the lung or lungs can be present, as vouched for by competent physicians, in the absence of physical signs. Cases in support of this are quoted, with some good radiographic illustrations. The author goes on to point out that the correct interpretation of chest radiographs is by no means the simple problem it is so often considered to be, and that in the majority of cases the X-ray evidence must be influenced by a knowledge of all the other facts bearing upon the case.

The paper by Jacobæus³⁸ on the *cauterization of adhesions in artificial pneumothorax* treatment of pulmonary tuberculosis under radioscopy control, though it is not essentially a radiographic paper, is nevertheless one which is of importance in radiography as showing the control exercised by the radiographic findings both before operation, during operation, and afterwards. This new and original work could not have been carried out if it had not been for the very fine X-ray demonstrations of the tuberculous lesions and the results of the artificial pneumothorax treatment. The author makes it clear that no case of phthisis should be subjected to an artificial pneumothorax until a previous X-ray examination has shown that it is a suitable case for this operation; he also makes it clear that after an artificial pneumothorax has been produced, a further X-ray examination is necessary to show exactly what has happened, and whether further interference is indicated or not.

Miner's Phthisis (see also TUBERCULOSIS).—Great importance, from the points of view both of diagnosis and prognosis, attaches to the X-ray examination of the lungs in relation to miner's phthisis on the Witwatersrand, and in a paper on this subject, in which some fine radiographic illustrations appear, Stuart⁴⁰ states that the X-ray examination holds a high place in the general summation of a mine-worker's condition. The standard technique adopted in order to obtain uniformity of results is described in full, and also the X-ray appearances in various stages of the disease. As the post-mortem examinations of lungs average over 450 per year, and the Bureau has now filed over 200,000 radiographs plus the medical dossiers of 57,000 workers to whom the radiographs refer, it is obvious that material is sufficient for definite conclusions to be reached.

Pneumonia.—Sante⁴¹ has examined 152 cases of ordinary lobar pneumonia at intervals during the course of the disease. This paper is very complete, and there are a large number of illustrations. The characteristic X-ray appearances are described, and amongst other findings the writer states that in the majority of cases it is evident that lobar pneumonia starts as a consolidation in the hilus region which rapidly spreads peripherally to involve an entire lobe. The average time for resolution is seven to ten days after the crisis, but may be effected in as short a time as three days. The paper also deals with the complications most frequently encountered, and with their X-ray appearances.

New Growths.—Two good papers deal with the X-ray diagnosis of new growths within the chest: one by Childs,⁴² and the other by Hall⁴³; the former is illustrated. There is not much that is new in either, but the differential diagnosis from the X-ray point of view is of interest. It is quite evident that in many cases the correct interpretation of the radiographs can only be arrived at certainly from a consideration of the history in addition.

Annular Shadows.—Brown's⁴⁴ paper on "Annular Shadows: are they cavities or spontaneous pneumothorax?" with some fine radiographs, is of considerable value. The importance of making an accurate differential diagnosis is obvious, especially as these shadows are not infrequently shown to be present in the absence of recognizable clinical signs. The writer quotes many opinions in favour of the pneumothorax interpretation, and his paper is largely taken up with his reasons for dissenting from this too optimistic view. His conclusion is that definite ring-like shadows, annular in both antero-posterior and lateral views, are practically always definite lung cavities; further, that all annular shadows of this kind should be considered as cavities until diligent observation and investigation prove that they must be interpreted in some other way. He admits, however, that very occasionally a pneumothorax may give rise to an annular shadow.

Pregnancy.—Stein and Arens¹⁵ are of the opinion that diagnostically radiographs are of considerable value during the second half of pregnancy, and some interesting radiographs are given to show what can be done by means of modern apparatus and technique. X rays can be used to decide the question of twins, and of course, if the fetal bones are shown before the time of quickening, the positive evidence is unassailable in all cases of pregnancy. Obscure positions can be detected, and a differential diagnosis made between pregnancy and other abdominal conditions. If a pneumoperitoneum is brought about, the gravid uterus is demonstrable in quite the early months of pregnancy.

The Bones.—

The Sella Turcica.—The importance of having an X-ray examination made in all cases of optic atrophy in which the cause is at all doubtful is insisted upon by Wright and Barnard.¹⁶ In many cases of pituitary disease or disease of the fossa involving the pituitary, optic atrophy is the only obvious sign, and it is impossible to reach the correct diagnosis without the assistance of radiography.

Osteitis Deformans.—Moore⁴⁷ gives a very complete history of the literature of this disease, and refers to four cases he has observed. The characteristic radiographic appearances are shown, and the diagnosis from other bone conditions is discussed. Jack⁴⁸ also publishes a report on a case of this disease, and details the X-ray appearances. A further case is reported by Wallace Jones and Holland,⁴⁹ who describe the clinical condition and the radiographs. The X-ray appearances in this case are very typical and general, and exhibit very well the varying stages of the disease as it affects different bones. These changes are essentially a combination of a rarefying with a proliferative osteitis, and the varying X-ray appearances will depend upon which of the processes is in the ascendant, as well as on the stage of the disease. For the most recent work on the pathology, consult a paper by Cone,⁵⁰ finely illustrated, and the result of a very complete research carried out by the author.

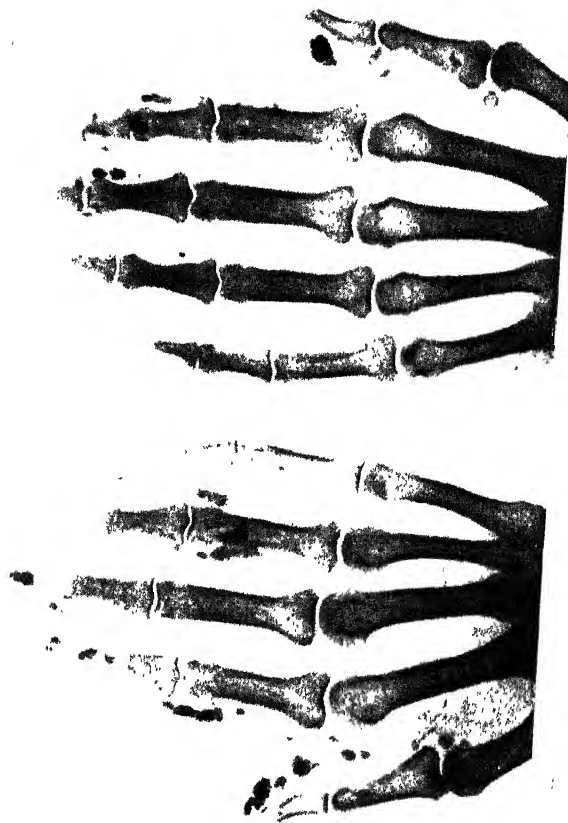
Marble Bones.—Alexander⁵¹ reports with radiographs a remarkable case of this rare disease in a woman, 43 years of age. The essential feature radiographically is that nearly all the bones show such an increase in lime salts that they cast extremely dense shadows and practically all bone detail is lost. The paper by Schulze,⁵² in which he reported all the cases he could find—six in number—in the German literature, is more or less fully reproduced, translated into English, and some of his illustrations are included. The author states that in a careful search of the literature in the English language he failed to find any report of such a case. It is of interest to note that the youngest case reported, an infant 3 weeks of age, and this case of a woman of 43, both showed identically the same X-ray findings. The etiology is very obscure. Ghormley⁵³ reports a case in a male child, 8 years of age, who was radiographed on account of some hip trouble, the condition suggesting a beginning epiphyseal separation of the head of the left femur. Radiographs showed a curious density of all the bones, and further it was found that the bones of the child's father showed the same appearances, whilst those of the mother were normal. He says that he could find no living case reported in the literature, but several had been described at autopsy. The general view is that the sclerosis is secondary to an irritation which goes with an unknown morbid process in the blood, but in this case the disease appeared to be inherited.

Osteitis Fibrosa.—A valuable research on osteitis fibrosa by Knaggs⁵⁴ throws much new light on this disease, and should be of interest to all radiologists.

Ossification Disturbance of the Os Calcis.—Heim⁵⁵ reports a case in a girl, 11 years of age, who had complained of pain in the heel for a few weeks. In the radiograph the os calcis appeared indistinct, and the trabeculae soft, as

PLATE LIV.

CALCAREOUS DEPOSIT IN FINGERS



though 'blotted'; near the epiphysis was an irregular clear space about the size of a finger nail. The epiphysis itself was indistinct in outline and irregularly ossified. After four weeks' rest all the symptoms had disappeared, and at the end of seven weeks the foot was quite normal. This condition appears to be analogous to Köhler's disease, and the pathogenesis is not yet explained.

Bone Tumours.—Nichols⁵⁶ enters fully into the radiographic diagnosis of tumours of bone, which he classifies under four headings: (1) Their origin, whether medullary or cortical; (2) Whether characterized by bone production or destruction; (3) The condition of the cortex, whether expanded or destroyed; (4) Whether the growth is invasive or non-invasive. The author then describes what he considers to be the radiographic characteristics of all the more important bone tumours, malignant and benign. To be read with this paper is one by Bloodgood,⁵⁷ who briefly records the salient facts which he has harvested from more than 1000 records, and shows the difficulty of diagnosis when cases of tuberculous and pyogenic osteomyelitis resemble, both clinically and radiographically, periosteal or central malignant lesions. Very great stress is laid on the point that in slight radiographic lesions it is not as a rule safe to commit oneself to a definite diagnosis without a radiograph of the corresponding sound bone. There are a large number of valuable observations in this paper from the point of view of radiological interpretation and diagnosis.

Small-pox Appearances in Bones.—Sheldon⁵⁸ draws attention to the X-ray appearances in bones which may be caused by small-pox. He quotes a few previous observations and records two of his own cases. The long bones and their articulations are the ones most frequently affected, bones being shortened, articulations destroyed, and fusion of bones occurring.

Calcareous Deposit in Fingers.—Logan⁵⁹ reports and illustrates a very interesting case of abnormal calcareous deposits in the fingers of a woman, 60 years of age, who suffered from a mild form of Raynaud's disease. The deposit consisted of phosphate and carbonate of lime. Some references to literature are made, and to one similar case in a French journal. In the latter case the deposit was found to begin inside the capillaries. (*Plate LIV.*)

REFERENCES.—¹*Brit. Med. Jour.* 1922, ii, 705; ²*Jour. Roentgen Soc.* 1923, July, 123; ³*Ibid.* April, 55; ⁴*Arch. of Radiol. and Electrotherap.* 1923, Jan., 234; ⁵*Proc. Roy. Soc. Med. (Electrotherap. Sect.)*, 1922, xv, 7; ⁶*Acta Radiologica* 1922, i, 480; ⁷*Ibid.* 1923, ii, 77; ⁸*Jour. of Laryngol. and Otol.* 1923, 229; ⁹*Amer. Jour. Roentgenol.* 1923, 547; ¹⁰*Arch. of Radiol. and Electrotherap.* 1922, Sept., 103; ¹¹*Amer. Jour. Roentgenol.* 1922, 792; ¹²*Arch. of Radiol. and Electrotherap.* 1923, March, 304; ¹³*Amer. Jour. Roentgenol.* 1923, 31; ¹⁴*Ibid.* 87; ¹⁵*Ibid.* 526; ¹⁶*Ibid.* 1922, 527; ¹⁷*Ibid.* 1923, 369; ¹⁸*Jour. Amer. Med. Assoc.* 1923, 464; ¹⁹*Amer. Jour. Roentgenol.* 1923, 259; ²⁰*Arch. of Radiol. and Electrotherap.* 1923, July, 33; ²¹*Amer. Jour. Roentgenol.* 1922, 713; ²²*Brit. Med. Jour.* 1923, ii, 174; ²³*Proc. Roy. Soc. Med. (Sect. Urology)*, 1922, Dec. 1; ²⁴*Arch. of Radiol. and Electrotherap.* 1923, April, 334; ²⁵*Amer. Jour. Roentgenol.* 1923, 19; ²⁶*Brit. Med. Jour.* 1923, ii, 8; ²⁷*Amer. Jour. Roentgenol.* 1922, 632; ²⁸*Acta Radiologica*, 1923, 31; ²⁹*Bull. et Mém. Soc. Chir. de Paris*, 1923, 189; ³⁰*Arch. of Radiol. and Electrotherap.* 1923, May, 353, Aug. 72, and Sept., 111; ³¹*Proc. Roy. Soc. Med. (Electrotherap. Sect.)*, 1923, 1; ³²*Amer. Jour. Roentgenol.* 1922, 823; ³³*Jour. de Radiol. et d'Electrol.* 1923, 1; ³⁴*Acta Radiologica*, 1923, 38; ³⁵*Jour. Amer. Med. Assoc.* 1923, lxxx, 236; ³⁶*Amer. Jour. Roentgenol.* 1923, 454; ³⁷*Arch. Radiol. and Electrotherap.* 1923, June, 20; ³⁸*Proc. Roy. Soc. Med. (Electrotherap. Sect.)*, 1923, May, 31, and *Arch. Radiol. and Electrotherap.* 1923, June, 23; ³⁹*Proc. Roy. Soc. Med. (Electrotherap. Sect.)*, 1923, 91; ⁴⁰*Arch. of Radiol. and Electrotherap.* 1923, Feb., 277; ⁴¹*Amer. Jour. Roentgenol.* 1923, 351; ⁴²*Ibid.* 175; ⁴³*Ibid.* 182; ⁴⁴*Ibid.* 1923, 445; ⁴⁵*Jour. Amer. Med. Assoc.* 1923, July, 4; ⁴⁶*Brit. Jour. Ophthalmol.* 1923, 123; ⁴⁷*Amer. Jour. Roentgenol.* 1923, 507; ⁴⁸*Ibid.* 1922, 626; ⁴⁹*Arch. of Radiol. and Electrotherap.* 1923, June, 17; ⁵⁰*Jour. of Bone and Joint. Surg.* 1922, Oct., 751; ⁵¹*Amer. Jour. Roentgenol.* 1923, 280; ⁵²*Arch. f. klin. Chir.* 1921, cxviii, 411; ⁵³*Johns Hop. Hosp. Bull.* 1922, Dec.; ⁵⁴*Brit. Jour. Surg.* 1923, April, 487; ⁵⁵*Zentralbl. f. Chir.* 1923, 698, *Brit. Med. Jour. (epit.)*, 1923, ii, 11; ⁵⁶*Surg. Gynecol. and Obst.* 1922, Sept., 301; ⁵⁷*Amer. Jour. Roentgenol.* 1923, 42; ⁵⁸*Ibid.* 1923, 35; ⁵⁹*Arch. of Radiol. and Electrotherap.* 1923, July, 55.

YELLOW FEVER.*Sir Leonard Rogers, M.D., F.R.C.P., F.R.S.*

ETIOLOGY.—W. H. Hoffmann¹ has studied in Cuba experimental infections of guinea-pigs with Noguchi's Merida strain of *Leptospira icteroides*; he did not obtain fatty degeneration of the liver, but rather lesions similar to those produced by *Leptospira icterohæmorrhagica*. T. G. Perrin,² however, points out that the Cuba infections showed evidence of contaminating secondary infections affecting the results, and he has obtained typical fatty degeneration of the liver in guinea-pigs with the yellow-fever organism.

PROPHYLAXIS.—M. E. Connor³ records that no cases of yellow fever have occurred in Merida, Yucatan, for over a year since the disease disappeared as the result of mosquito control; so he believes that this, the principal and most constant endemic focus in Mexico and possibly on the North American continent, is eradicated. He thinks the former depopulation of the ancient Maya cities of Mexico was due to yellow-fever prevalence, as they relied for their water supply on cisterns similar to those which still breed the mosquito carrier in abundance when uncontrolled. The stegomyia index at the beginning of the campaign in February, 1921, was 50 per cent; by October it had been reduced to 8.5, and at the time of writing to only 1.75 per cent, representing almost complete extinction of the *Aedes calopus* by means of destruction of the larvæ in the fresh-water containers by means of stocking tanks with one or more bottom eating, in preference to surface feeding, fish, to covering tanks, to oiling, or to removing larvæ from containers by passing the water through muslin where the water could not be thrown away on account of its great scarcity. Nearly fifty thousand water retainers were inspected every ten days.

M. E. Connor and W. M. Monroe⁴ deal with the value of stegomyia indices in yellow-fever control, and regard the 'deposit index'—namely, the percentage of discovered breeding-places of the total number of containers examined—as the best index, although some prefer the 'house index' or percentage of houses breeding mosquitoes. W. M. Munroe⁵ deals with the limit of usefulness of fish in larvæ control, and points out that a single bottom feeder, as usually supplied for cisterns to avoid unnecessary contamination of the drinking water by their excreta, will only consume about 150 larvæ a day, or the larvæ resulting from the eggs laid by fifteen female insects, and the occurrence of numerous larvæ in spite of the presence of a fish indicates an excessive demand on its feeding powers as the result of inefficient inspections and control.

Noguchi⁶ has found that instances of non-immune persons contracting yellow fever after vaccination occur within the first thirteen days, of which six days are the incubation period, so that immunity is not fully developed in the first few days after the inoculation. To remedy this defect he uses yellow-fever serum, which produces temporary passive immunity, and he estimates that 1.6 c.c. of the serum will protect an adult male for seven days. P. Grovas⁷ has studied the diagnostic value of serum reactions, and found agglutination and lysis in dilutions of 1-100 of serum with cultures of the *Leptospira icteroides* beginning in the second week of the disease; but none in controls, even in dilutions of 1-20 to 1-40. The reaction also occurs after recent protective inoculation against the disease, but is usually absent several years after an attack. In 183 tests none were positive on the first day, 2 only out of 35 on the second to the fifth days, 20 of 28 on the sixth, and 95 of 115 on the seventh to twenty-seventh days, and in 7 of 11 persons vaccinated against the disease. The Pfeiffer reaction and complement-fixation reactions were not found to be of much practical value.

REFERENCES.—¹*Jour. Trop. Med. and Hygiene*, 1922, Nov. 15, 353; ²*Amer. Jour. Trop. Med.* 1923, Jan., 27; ³*Ibid.* 1922, Nov., 487; ⁴*Ibid.* 1923, Jan., 9; ⁵*Ibid.* 21; ⁶*Jour. Amer. Med. Assoc.* 1922, Oct. 14, 1361; ⁷*Amer. Jour. Trop. Dis.* 1923, July, 325.

Miscellaneous.

THE EDITORS' TABLE.

Samples (not returnable) and particulars for this section should be sent to The Editors, 'Medical Annual' Offices, Stonebridge, Bristol, not later than NOVEMBER 30.

We are anxious to express no opinion except as a result of practical knowledge, and it is owing to this act that a notice in the MEDICAL ANNUAL has come to be valued.

NEW PHARMACEUTICAL PRODUCTS AND DIETETIC ARTICLES.

We are always ready, when a sufficient quantity is sent to us EARLY IN THE YEAR, to arrange for these to be tested in hospital practice and reported upon; under other circumstances our knowledge is necessarily more limited; but frequently the simple information as to where a particular preparation can be obtained is all the practitioner requires.

NEW MEDICAL AND SURGICAL INSTRUMENTS AND APPLIANCES.

We give Inventors and Manufacturers the opportunity of bringing their work before our readers entirely free of cost to themselves, subject only to the following conditions:—

(1) Each article sent for notice must have the novelty or improvement claimed for it clearly stated upon a SEPARATE sheet or sheets of paper. This should have attached to it any illustration (WHICH MUST BE SMALL) for which insertion is desired, and also bear the maker's name. The attention of firms who send a large number of articles for notice is particularly directed to the above condition, as each article has to be sorted into its proper department before it can be considered.

(2) Medical Inventors should merely describe the instrument or appliance, and avoid giving technique of operations.

The Editors are not able to accept reference to circulars, catalogues, or literature as a compliance with these conditions.

PROGRESS OF PHARMACY, DIETETICS, Etc.

Acriflavine-Neutral.—A brownish-red powder which is easily soluble in water, yielding an absolutely clear solution which at any concentration is neutral in reaction. Concentrated solutions are stable for a considerable period, but it is recommended that solutions should be made up as required from the dry substance. Solutions of acriflavine-neutral ('Boots') do not attack metals. The dry substance contains above 90 per cent of the compound denoted by the formula $C_{10}H_{11}N_3Cl$. Excellent results have been reported with neutral acriflavine in cases of rheumatic fever, pneumonia, endocarditis, puerperal fever, erysipelas, and other acute cases of infection. The usual dose appears to be from 40 to 100 c.c. of a 1-200 solution in normal saline, but recently a suitable dose for an adult was found to be 10 mgrm. per kilo of body weight dissolved in 20 c.c. of water.

Messrs. Boots also supply acriflavine in the form of pessaries, which are useful for vaginismus and gonorrhoeal infections, gauze (1-1000), and in a paraffin emulsion. They also prepare an oleate. (Messrs. Boots Pure Drug Co. Ltd., Nottingham.)

Adrenalin 'Ciba'.—Prepared synthetically, adrenalin 'ciba' is in a state of absolute purity. Chemically and physiologically, it is identical with the natural base; it is levorotatory (-50.3°) and meets all the requirements of the British Pharmacopœia, 1914. It is available in the form of crystals 100 per cent pure, and solution 1-1000. The solution is permanent, stable, and may be sterilized without interfering in any way with the activity of the product. (Messrs. The Clayton Aniline Co. Ltd., 68½, Upper Thames Street, E.C.4.)

Agomensin.—This is a corpus luteum extract, and its physiological action is antagonistic to that of sistomensin. (Ref. MEDICAL ANNUAL, 1923, p. 519). The particular action of agomensin is to regulate development in cases of retardation and hypofunction, and to assist actively the menstrual cycle. Agomensin tablets, ½ gr., are successfully exhibited in functional amenorrhœa, disturbances subsequent to oophorectomy, menopause, etc. (Messrs. The Clayton Aniline Co. Ltd.)

Allonal ('Roche') is a combination of a new barbituric acid derivative (allyl-isopropyl-barbituric acid), with phenyl-dimethyl-dimethylamino-pyrazolon (amidopyrine) in molecular proportions. Its discovery was not accidental, but the culmination of a long series of experimental researches having for their end the synthesis of a better hypnotic than the resources of chemistry had yet attained. It gives rest and sleep, not only in cases in which the insomnia is due to nervous disturbances, but also in many conditions in which the insomnia results from pain: conditions in which recourse would formerly have been had to morphine or other narcotics. It is used in tablets of one grain. Two or more may be used if necessary. (Messrs. The Hoffmann-La Roche Chemical Works Ltd., 7 and 8, Idol Lane, E.C.3.)

Anti-neurasthenia Tablets.—The glycerophosphates and formates have long been regarded to have a general tonic effect on the nerves. In this tablet they are combined with a small amount of quinine sulphate and nux vomica, thus forming a general useful preparation. The tablets are sugar coated, and therefore quite tasteless. We have personally tried these tablets for debility following influenza, with such good results that we can strongly recommend them. Price 2s. 6d. per 100. (Messrs. R. Sumner & Co. Ltd., Liverpool.)

Asciatine is a combination of novamidon and butylchloral hydrate, a slightly hygroscopic crystalline powder with a faint aromatic odour. It acts as a powerful analgesic and antineuralgic in alleviating painful conditions in the trigeminal region and other nerve centres, headaches of all kinds, glaucoma, cyclitis, neuralgia, sciatica, and lumbago, and it relieves the irritation of cutaneous ailments whatever may be their peripheric or central cause. It reduces fever and helps sleep. (Messrs. Dick, Coates & Co., 41, Great Tower Street, E.C.3.)

Aspirin Tablets.—The most spectacular feature of these tablets is their ready disintegration. If a tablet is floated on the surface of a column of water, a cascade of disintegrated drug will be seen to fall almost immediately to the bottom of the vessel. The B.P. test with ferric chloride test solution is negative, indicating complete absence of free salicylic acid. It should be noted that the presence of free salicylic acid as shown by the B.P. test may be masked by the addition of citric and tartaric acids. Messrs. Boots and other firms of repute strongly deprecate this practice, the propriety of which is questionable. Aspirin tablets are prepared from acetyl salicylic acids made at Messrs. Boots' Chemical Works at Nottingham.

Balm Rhodia.—This is a combination of glycolic ether and salicylic acid. Its properties are similar to methyl salicylate without the disagreeable smell. It is used in rheumatic affections as an external application for the relief of pain. (Messrs. Dick, Coates & Co., 41, Great Tower Street, London, E.C.3.)

Benzyl Benzoate Perles.—Benzyl benzoate ('Boots') is now supplied in the form of capsules, containing min. $2\frac{1}{2}$ in min. 5. (Messrs. Boots Pure Drug Co. Ltd., Nottingham.)

Chloramine Antiseptic.—Contains 8.75 gr. chloramine-T with 8.75 gr. sodium chloride. One tablet in 2 fluid oz. of water forms a 1 per cent solution. If these tablets be moistened with water and allowed to stand for a few seconds, they may be powdered with the greatest ease and then readily brought into solution. (Messrs. Boots Pure Drug Co. Ltd.)

Colitis Cachets.—These cachets have been used with success in the treatment of colitis, their action depending on the liberation of free oxygen. (Messrs. Reynolds & Branson Ltd., Leeds.)

Colloidal Silver Pessaries.—Colloidal silver, while being non-toxic, is an extremely powerful antiseptic. It owes this property chiefly to its great power as an oxidizing agent. Colloidal silver, unlike most silver compounds, does not cause necrosis of the tissues, and it is therefore non-irritant to mucous surfaces. These pessaries (strength 1-8000) are issued in boxes containing one dozen. Price 2s. 6d. per box. (Messrs. R. Sumner & Co. Ltd., Liverpool.)

Colloidal Zinc Cream.—This is a decided improvement on the ordinary zinc ointment. In the first place, the zinc being present in a colloidal state exists in extremely small particles which pass readily through the outer layers of the epidermis, and the base, being a non-greasy one, also assists greatly in this respect. The result is a soothing and emollient action which is greatly superior to the ordinary zinc ointment of the British Pharmacopoeia. Issued in 4 oz. collapsible metal tubes. Price 2s. each. (Messrs. R. Sumner & Co. Ltd., Liverpool.)

Cutipiel.—A protective skin covering, antiseptic and soothing, for cases of minor injuries, cuts, etc., also useful in chilblains. Sold in tube with glass rod, 1s. each. (Messrs. Reynolds & Branson Ltd., Leeds.)

Dialacetin.—This is a combination of dial with an analgesic and antipyretic agent. While most cases of simple insomnia and excitement respond to dial (ref. *MEDICAL ANNUAL*, 1922, p. 510), dialacetin is of special service in the treatment of insomnia and cerebral excitement due to neuralgic pains and febrile conditions; consequently, it presents a useful method of treatment in sleeplessness accompanying sciatica, arthritis, etc. Dialacetin has also recently given some notable results in the treatment of epilepsy, especially in the hands of the French observers. (Messrs. The Clayton Aniline Co. Ltd.)

Garlic Antiseptic.—This chemical (trimethenal-allylic-carbide) has received much notice of late as an antiseptic. It has been used for a long time in medicine; thus, Messrs. Sumner & Co. have for many years made a syrup from the fresh garlic by maceration with dilute acetic acid. This syrup has been used chiefly in chronic bronchitis. Garlic antiseptic itself is certainly considered very safe, and one which will most probably obtain considerable popularity. Price 2s. 6d. per lb. (Messrs. R. Sumner & Co. Ltd., Liverpool).

Insufflation Outfit.—This is for carrying out the new mode of administering tuberculin, as advocated by Dr. Owen Paget. The method consists in applying tuberculin in fine powder to the region of the ethmoid and superior turbinates by means of a special insufflation tube passed high up the nostril. The tuberculin for use in the insufflator is supplied in graduated dosage, either in tablets which are readily reduced to powder by crushing, or in capsules from which the correct dose may be poured out on removing the cap. (Messrs. Parke, Davis & Co., London.)

Isarol (Ichthylol 'Ciba').—Isarol is prepared from the distillate of bituminous shales of French origin. It is a thick brownish-red liquid with a characteristic ichthylol odour. It is perfectly soluble in water and partially soluble in ether and benzol. There is a considerable difference between isarol and many of the ichthylol substitutes on the market, since in some of the latter the percentage of sulphidic sulphur, which is the therapeutic active sulphur combination, is as much as 50 per cent less than in isarol. Isarol possesses markedly antiseptic properties, and when applied externally promotes absorption; consequently it is useful in reducing swelling. In dermatology it is usually prescribed in glycerin, 5 per cent to 50 per cent of the drug, or as an ointment. For tampons a 10 per cent solution is employed. Isarol may also be administered internally as an antiseptic, in doses of from 5 to 60 minims combined with an equal part of peppermint water. It is issued in 1-lb. tins. (Messrs. The Clayton Aniline Co. Ltd.)

Lavox is a disinfectant intended for use in the lavatory, and it has the advantage of also removing all stains and deposits, even those which cannot be removed by frequent flushings with water. It is inexpensive, and a most useful thing to have in hospitals as well as in the private house. (Messrs. S.P. Charges Co., St. Helens, Lancashire.)

Lubricant.—A. J. Jelly is an antiseptic lubricant suitable for the hands or for surgical instruments. Being made with a non-greasy base it is readily removed by water. It is supplied in collapsible tubes, which will be found handy for carrying in the bag. (Messrs. Reynolds & Branson Ltd., Leeds.)

Migraine Cachets.—In severe cases of headache or neuralgia, etc., these cachets have been found to prove an effective remedy. (Messrs. Reynolds & Branson Ltd., Leeds.)

Mixed Vaccine for Bronchial Asthma prepared in the inoculation department of St. Mary's Hospital, London, W., and comprising the various organisms that are chiefly concerned in bronchial affections, small numbers only of the bacteria being administered. The vaccine is obtainable in bulbs of 1 c.c. and in bottles of 25 c.c. from the agents, Messrs. Parke, Davis & Co., London.

Neo-Protosil Ointment.—This ointment contains 5 per cent of neo-protosil—a colloidal silver iodide compound which is a powerful bactericide, and does not stain the tissues in the way that other silver compounds do, nor does it give rise to pain or irritation. It is useful in various inflammatory conditions of the eye, nose, ear, etc. Supplied in collapsible tubes by Messrs. Parke, Davis & Co., London.

Neo-Protosil Vaginal Suppositories contain 5 per cent of neo-protosil, which is a powerful bactericide (with specially destructive action on the gonococcus), and exerts an astringent and sedative influence upon mucous membrane. These vaginal suppositories are of service in various inflammatory conditions, in simple or specific vaginitis, leucorrhœa, cervical erosions, etc. Each suppository is enclosed in a soft tin sheath to obviate contamination; this is easily removed at the moment of use. The suppositories are supplied in boxes of 1 dozen by Messrs. Parke, Davis & Co., London.

Novarsan is an improved neosalvarsan of Empire production. Before issue each batch is tested and passed by the Medical Research Council. Novarsan is also approved by the Ministry of Health. This preparation combines low toxicity with high therapeutic value. It is supplied in the form of a powder, which is readily soluble in water, forming a solution ready for immediate use. Novarsan is also issued combined with a concentrated solution of dextrose. It is specially designed for intramuscular injection, and is supplied in ampoules ready for immediate use. Novarsan powder and intramuscular are supplied in the usual range of doses. Novarsan intramuscular is also supplied in small doses specially suitable for children. (Messrs. Allen & Hanburys Ltd.)

Oleo-Bi and Tartro-Bi.—The satisfactory results obtained in the treatment of syphilis by bismuth has induced The Hoffmann-La Roche Co. to make a number of experiments, and, as a result, two preparations will be placed on the market. Oleo-bi is used by intramuscular injection, tartro-bi by intravenous injection. It is claimed for oleo-bi that much larger doses are tolerated than is the case with other bismuth injections. It is well worth extensive trial.

Pavon.—This is an opium preparation, and is standardized and constant. It represents the total alkaloids of the drug in the form of tablets and liquid for internal use, and ampoules for hypodermic administration. One grain of pavon represents two grains of opium. The administration of pavon, even when extended over a considerable period, does not cause constipation or nausea, and this advantage would appear to be due to the relative amounts of morphine and secondary alkaloids in the preparation.

Pavon-Scopolamine.—Ampoules of this combination each contain $\frac{1}{2}$ gr. pavon and $\frac{1}{10}$ gr. scopolamine hydrochloride, and are of special service for the initiation of anaesthesia. (Messrs. The Clayton Aniline Co. Ltd.)

Pitibulin is a physiologically standardized extract of the infundibular lobe of the pituitary gland specially prepared for hypodermic use. It is now issued as pitibulin obstetric, equal to 10 per cent extract, as recommended by the Medical Research Council for obstetrical and general purposes. It is specially indicated in the second stage of labour to promote contraction of the inert uterus, and after delivery to check post-partum hæmorrhage. Pitibulin surgical is a 20 per cent extract identical with pitibulin as hitherto supplied by Messrs. Allen & Hanburys Ltd. Both strengths of pitibulin are issued in 'azoules' containing $\frac{1}{2}$ c.c. and 1 c.c. respectively.

Protein Extracts.—More than 100 specific proteins (foods, pollens, hair, feathers, wool, bacteria, etc.) are supplied in sterile and stable pastes in collapsible tubes convenient for use in testing for protein idiosyncrasy by the cutaneous reaction. In addition to the individual protein preparations, tubes containing grouped cognate proteins are supplied, the use of which greatly reduces the time necessary for detecting the provocative protein or proteins. (Messrs. Parke, Davis & Co., London.)

Protein Sensitization Tests.—Protein therapy has advanced our knowledge of the etiology of many diseases, particularly hay fever, asthma, and urticarial conditions. By using the simple and convenient group tests, every physician can now discover for himself the protein to which a patient is sensitive or which may be at the root of his complaint. These group tests, which are supplied in capillary tubes in solution, are a considerable advance over the older methods of individual tests with powders. A most comprehensive series of group tests is supplied by Messrs. Allen & Hanburys Ltd., and every physician should take advantage of these valuable aids to diagnosis.

Quinine-Phytin represents the quinine salt of inosite-hexaphosphoric acid, and contains 58 per cent of quinine. One grm. represents 0.5 grm. of phytin and corresponds to 0.7 grm. quinine hydrochloride or 0.8 grm. quinine sulphate. It has proved useful in the treatment of influenza, malaria, and other manifestations associated with excessive loss of phosphorus during pathological processes. Tablets $1\frac{1}{2}$ gr. (Messrs. The Clayton Aniline Co. Ltd.)

Thyorehic Compound Tablets.—This formula combines orchic (testicular) substance with suprarenal and thyroid, and provides a trio of synergistic hormones which may prove useful in cases of impotence, neurasthenia, hystero-epilepsy, etc. Supplied in bottles of 25 and 100 by Messrs. Parke, Davis & Co., London.

Thyrovarian Compound Tablets.—This formula, which associates dried suprarenal and thyroid glands with dried ovarian substance, is prepared in response to the requirements of physicians desiring to prescribe a pluriglandular combination in gynæcological disorders. It is supplied in bottles of 25 and 100 by Messrs. Parke, Davis & Co., London.

Toxol.—Under this name Messrs. Boots have introduced a lysol disinfectant of great efficiency. A 1 per cent solution of this disinfectant is a perfect sterilizer of the hands, instruments, and wounds. (Messrs. Boots Pure Drug Co. Ltd., Nottingham.)

Urazine.—This contains 2 molecules of piperazin, 1 molecule of citric acid, and 1 molecule of salicylic acid united in 1 molecule of a 'double' salt, which contains 343 mgrm. of piperazin, 275 mgrm. of salicylic acid, and 382 mgrm. of citric acid. It has been found useful in gout and rheumatism, and for neuralgic and muscular pains. (Messrs. Dick, Coates & Co., Ltd., Great Tower Street, E.C.3.)

MEDICAL AND SURGICAL APPLIANCES.

Abdominal Supports.—We find many patients who, although they do not need any considerable pressure on the abdomen, are better for some support. In these cases

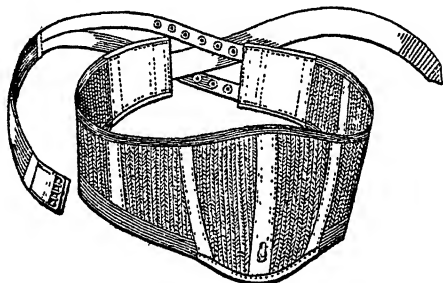


Fig. 100.

we find two of the Domen belts which we illustrate very useful. *Fig. 100* is of natural colour, strong stockinet, and is very soft and pliable and quite pervious. *Fig. 101* is

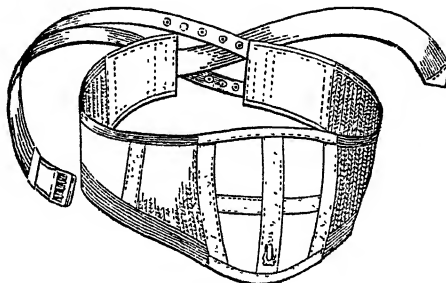


Fig. 101.

also made of strong stockinet, and has some light steels which increase the support. It only costs 15s. 6d., and is useful to those who have much physical work involving abdominal strain. (Messrs. 'Domen' Belts Co. Ltd., 56, Strand, W.C.2.)

Bath for Pyretic Treatment.—This is a combined foot and vapour bath, designed by Dr. Percy Wilde, to enable pyretic treatment to be given at the patient's home. It will be seen from the illustrations (*Figs. 102, 103*) that a separate bath is provided for each foot, and between them is an air chamber heated by a spirit lamp which generates vapour from the wet towel placed over it. The patient sits in a



Fig. 102.

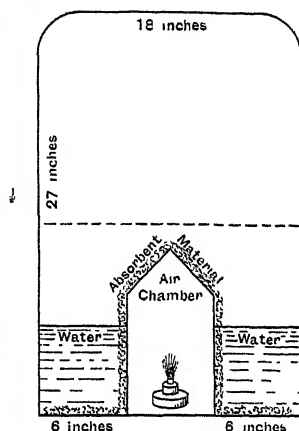


Fig. 103.

chair, covered with a special wrapper which secures that the hot vapour passes between it and the skin. The temperature of the body is raised 3° in fifteen to twenty minutes, accompanied by copious sweating. It is absolutely safe and highly efficient. Mr. J. Quirke, Lansdown Road, Bath, is the manufacturer.

Baths (Medicated).—The S.P. Charges Co., St. Helens, Lancs., supply all the requirements for giving Nauheim baths in the patient's own bath-room and without causing injury to the bath. The materials supplied give a steady supply of carbonic acid gas for about thirty minutes. The same firm also supply a pine extract for use in baths, which gives all the stimulation and fragrance of the pine and makes the bath very soothing and comforting.

Chair for Bárány's Nystagmus Test.—This chair is fitted with a head rest, which enables the test to be made with the head in various positions. It is on a heavy base, and revolves freely, pressure on the pedal stopping and fixing the chair in certain positions. (Messrs. Mayer & Phelps, New Cavendish Street, W.1.)

Costmeter with Medical and Dental Cards.—The 'Costmeter' Visible Card Index supplied by Messrs. Boots' Systems Department, is the simplest, quickest, and most compact of filing systems. Special cards are provided for medical and dental purposes. Our readers interested in the matter will do well to apply for an illustrated explanatory pamphlet from Messrs. Boots Pure Drug Co. Ltd., Nottingham.

Cotton-wool.—Absorbent cotton-wool supplied in the special 'Regaid' patented improved package marks a distinct advance in the packing of cotton-wool. It keeps the wool neat, clean, and dust-proof, and has the additional advantage of allowing at no time more wool to be exposed than is really needed. (Messrs. Boots Pure Drug Co. Ltd.)

Cystoscope Colour Slides.—These have been designed by Professor Ringleb, with Carl Zeiss, for use in cystoscopy. There are three slides made in three colours as under :—

Blue Colour Slide which gives a daylight effect and enables the exact colour of the urine in the bladder to be determined. It is less tiring to the eye, and enables a more accurate observation to be made.

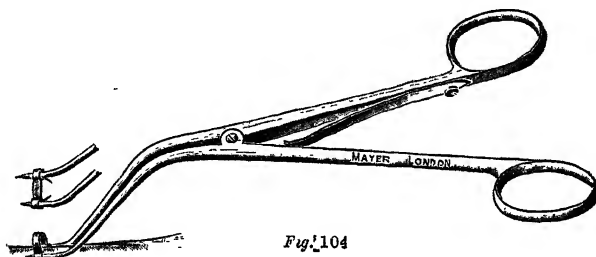
Green Colour Slide changes the colour of red inflammation into black, enabling it to be seen more easily. It also changes the colour of pus to grey, so that it may be more readily detected.

Yellow Colour Slide enables methylene blue oozing from the ureters to be seen more distinctly. (Messrs. Allen & Hanburys Ltd., Wigmore Street, W.1.)

Examination Outfit ('The Sterilex').—This enables a practitioner to carry in his pocket a complete electrical outfit for examining the throat, nose, and ear by electric light, and also a laryngoscope. It is put up in a khaki drill case, $7 \times 3\frac{1}{2} \times 1\frac{1}{4}$ inches. The nose and ear specula are well made, and can be fitted to the lamp without trouble. The light is under control, and may be made either intermittent or continuous. There is also a special tube for concentrating the light upon any object. It is supplied by Messrs. A. E. Braid & Co. Ltd, 30, Gower Place, W.C.1.

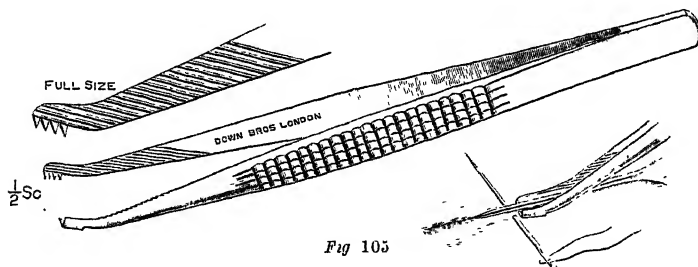
Forceps.—

Forceps for removing Michel's Clips.—Dr. Frank Edwards has designed a pair of forceps (*Fig. 104*) which render the removal of Michel's clips much easier than by the ordinary method. They have two points instead of blades, one point being



$\frac{1}{8}$ in. longer than the other. The method of use is to insert the longer point into an eye of the clip, and, while this point is steadied, the shorter one can easily be fitted into the other eye. The handles are then closed and the clip is stretched out flat, being then easily removed. (Messrs. Mayer & Phelps, New Cavendish Street, W.1.)

Skin Forceps.—Mr. C. P. Childe has designed a useful forceps for skin suture, with the object of securing full eversion of the skin enclosing the wound. The forceps have strong blades, deeply serrated on the inner surface near the edges, to secure a firm hold on the skin to prevent slipping. The ends of the forceps, as shown (*Fig. 105*),



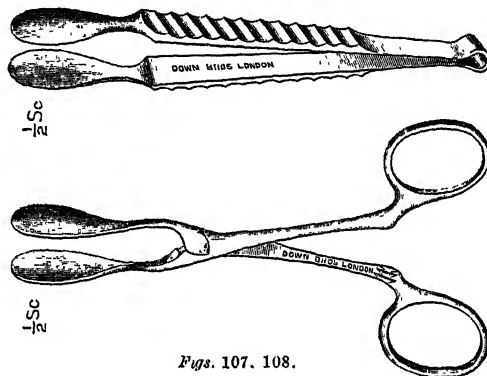
are bent at an angle to the blades, and on the under edge are three strong teeth. On applying the forceps fairly close to the edges of the skin, one on each side, and pressing the blades firmly together, the edges themselves are evenly everted, and an assistant can run either a straight or curved needle through both lips of the wound, and tie the suture, while the surgeon holds them in the everted position. (Messrs. Down Bros. Ltd., St. Thomas's Street, S.E.)

Suture Forceps and Scissors, Combined.—This instrument (*Fig. 106*) is made on the same plan as Kocher's scissors; when not actually in use they hang from the middle or ring finger, and can be rapidly swung into position when required for assisting in tying and cutting the sutures. Made in two sizes, 5 and 6 in., by Messrs. Mayer & Phelps, New Cavendish Street, W.1.



Fig. 106.

Swab-squeezing Forceps.—The illustrations (*Figs. 107, 108*) show two forms of swab-squeezing forceps which have been made by Messrs. Down Bros. Ltd. to the design



Figs. 107, 108.

of Mr. R. L. Spittel, of Colombo. They are used for squeezing and holding swabs in dressing wounds in the same manner as the thumb and finger are usually employed.

Tongue Forceps.—Messrs. A. E. Braid & Co. Ltd. of 30, Gower Place, W.C.1, and Messrs. R. Sumner & Co. Ltd., Liverpool, both send us an excellent pair of tongue forceps with rubber grips and bow handles. (*Fig. 109*). These are very efficient and

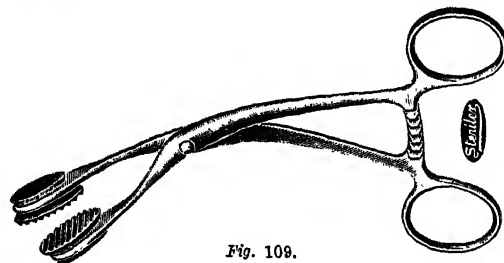


Fig. 109.

well made. The jaws are covered with rubber pads which prevent injury to the tongue while there is no danger of slipping. These pads can be easily sterilized. They are quite the best tongue forceps for general use.

Gastroscope.—This is a new instrument designed by Wilhelm Sternberg and made by Georg Wolf, Berlin. In shape it is like a large cystoscope, fitted with a similar

optical system and lamp, also an aerial device for dilating the stomach. It is intended for use with the patient in the knee-elbow position without an anæsthetic, and the claim is made that the whole of the interior of the stomach may be examined with this model. (Messrs. Allen & Hanburys Ltd., Wigmore Street, W.1.)

Hypodermic Syringes.—The advantage claimed for the '*Brawoodine*' All Glass Syringes is that they have an indestructible index, and we note that they are marked both in minims and cubic centimetres. They are all glass, and made in various sizes from 1 c.c. to 20 c.c., and are supplied in metal case with two needles. (Messrs. A. E. Braid & Co. Ltd., 30, Gower Street, W.C.1.)

Pocket Hypodermic Syringe.—This pattern (Fig. 110) enables a syringe, charged with fluid, and with needle attached, to be carried in the waistcoat pocket. It is well made, compact, and convenient. (Messrs. R. Sumner & Co. Ltd., Liverpool.)

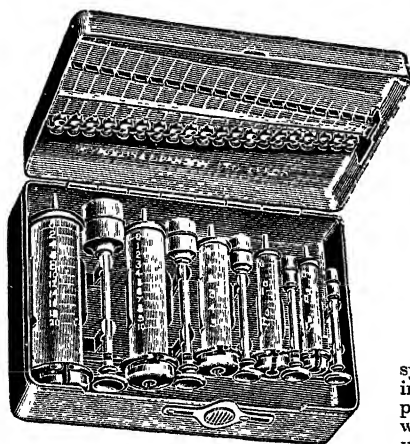
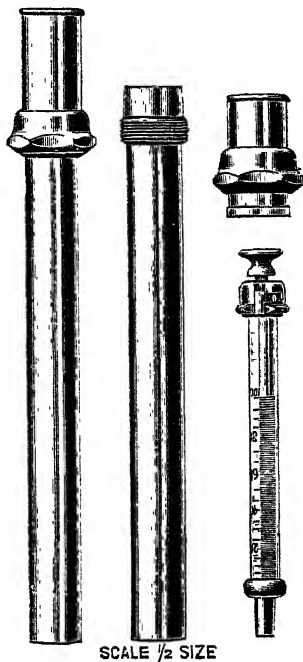


Fig. 111.

ing, or any other purpose. They are fitted into a rack and into a metal case, with two dozen needles of different sizes (Fig. 111). Price complete, £3 7s. 6d. (Messrs. Reynolds & Branson Ltd., Leeds.)

Pocket Record Syringe, 'The Holborn.'—This syringe (Fig. 112) enables a doctor to carry with him an aseptic syringe ready for use at a moment's notice. The case can be filled with alcohol, and has a screw cap with washer to prevent leakage of the liquid. The needle is carried fitted into a receptacle on the plunger, which can also be filled with alcohol, and can be fixed into position by disconnecting the glass part and inserting the nozzle into the needle mount without the operator touching the needle. The pocket clip attached to the case enables a doctor to carry it upright like a fountain pen. This is a very ingenious and practical invention. (The Holborn Surgical Instrument Co. Ltd.)



SCALE 1/2 SIZE

Fig. 110.

Record Syringes.—A set of five Record syringes will be found very useful in institutions and private practices where syringes of varying capacities are required for aspirating, injecting,

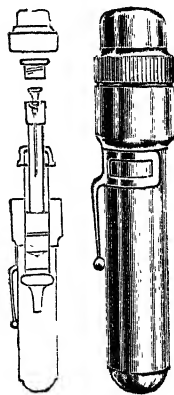


Fig. 112.

Inhalers.—*The De Caux Inhaler* (*Fig. 113*) is a modified form of the American pattern ether inhaler described by Flagg. It possesses all the advantages of the closed

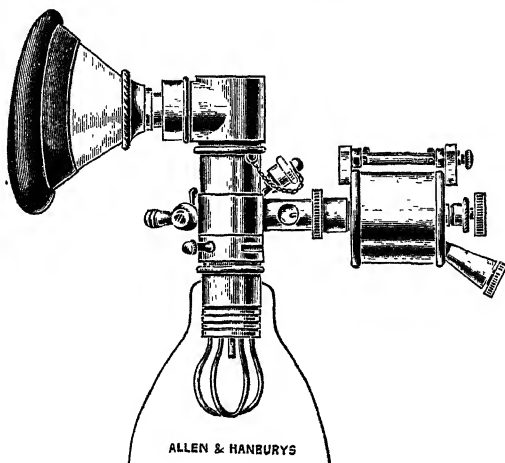
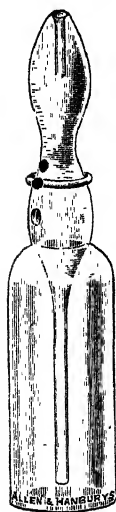


Fig. 113.

ether inhaler without any of its drawbacks. (Messrs. Allen & Hanburys Ltd., Wigmore Street, W.1.)

Macdonald's Inhaler.—As will be seen from the illustration (*Fig. 114*), this consists of a small glass bottle with nosepiece. The bottle is so made that the air inhaled must pass through the medicament. (Messrs. Allen & Hanburys Ltd., Wigmore Street, W.1.)



SCALE $\frac{1}{2}$
Fig. 114.

Inhaler for Nitrous Oxide, Oxygen, and Ether.—The apparatus illustrated (*Fig. 115*), has been designed by Dr. I. W. Magill, Sidcup. It is extremely light and portable, measuring $6 \times 3 \times 6$ inches, and can be used either alone or in conjunction with the portable intratracheal insufflation apparatus. It is claimed that it is a thoroughly efficient simple form of sight feed apparatus, and yet its size is such that it can readily be carried in an anaesthetist's handbag. The makers are Messrs. Down Bros. Ltd.

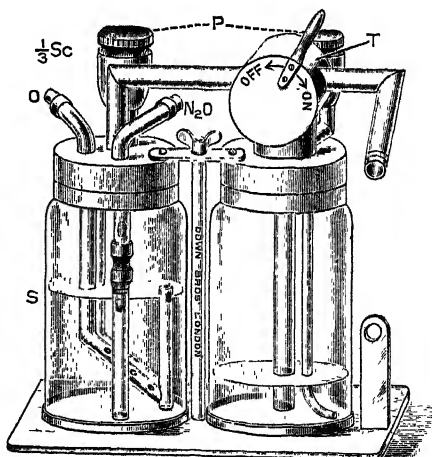


Fig. 115.

Inhaler for Warmed Ether.—In this apparatus (*Fig. 116*) the air from the bellows, instead of passing direct through the ether, is first heated by being passed through a loop of copper tubing, which is placed within the spiral coil immersed in hot water

and contained in the large thermos flask. This increases the evaporation of the ether, thereby producing a high percentage of ether vapour, and a steady and uniform strength. It is claimed by Dr. Bampfylde Daniell, who designed the appliance, that a very strong



Fig. 116.

anæsthesia is produced, so that little chloroform is required. (Messrs. Mayer & Phelps, New Cavendish Street, W. 1.)

Iodine Pen.—This is an ingenious appliance (*Fig. 117*) for the external application of iodine. It enables the iodine to be carried without damage to other articles, which

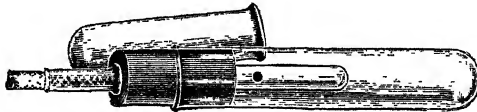


Fig. 117.

is usually the case when it is in a bottle; and allows the iodine to be applied without using a brush which must be subsequently dried and cleaned. It is an exceptionally handy thing and costs only one shilling. (Messrs. A. E. Braid & Co., Ltd.)

Knife (Diathermy).—Mr. Walter G. Howarth has found the instrument here described (*Fig. 118*) useful in the excision of malignant growths of the pharynx, tongue, tonsil, and palate with the diathermic spark. It consists of a platinum knife embedded in a thin glass tube covered for the purpose of further insulation by thick rubber tubing.



Fig. 118.

The cable is very light. The instrument has been in use for several years at St. Thomas's Hospital. The advantages over the usual soft metal knife are that a more intense and less diffuse spark is obtained. This is particularly useful when it is desired to use the spark as a cutting instrument in the complete excision of growths. The instrument can be obtained from Messrs. Mayer & Phelps, New Cavendish Street, W.1

Laminectomy Retractor.—This is designed by Mr. C. P. G. Wakeley, and is intended for the retraction of the erector spinæ muscles. If the muscles are peeled away on either side, and the retractor inserted, an excellent view of the laminae is obtained and a troublesome hæmorrhage avoided (*Fig. 119*). (Mr. J. H. Montague, 69, New Bond Street, W.1.)

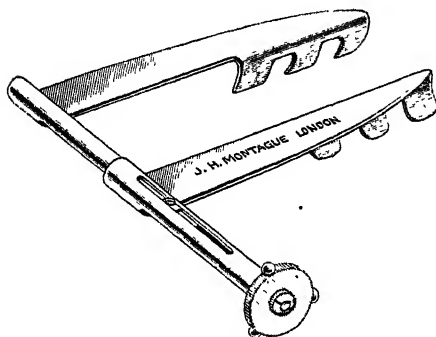


Fig. 119.

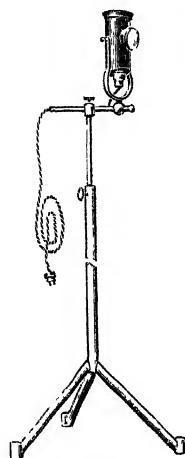


Fig. 120.

Laryngoscopic Lamp on Stand.—The Holborn Surgical Instrument Co. Ltd. have recently put on the market a simple but effective laryngoscopic lamp on stand (*Fig. 120*). The base is white enamelled, and the telescopic rod and arm are brass nickel-plated. The lamp can be raised, lowered, or adjusted to any angle. It is fitted with a revolving shutter to close the bull's eye, and small hole at the back, so that it can be reversed and used for ophthalmic work.

Lumbar Puncture Needle.—Designed by Professor H. R. Dean, of Cambridge, to avoid the contamination of cerebrospinal fluid by the hands of the operator. The

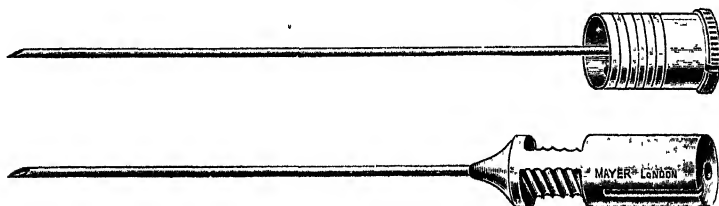


Fig. 121

stilette (*Fig. 121*) is mounted in a guard which, when the stilette is in the cannula, completely covers and protects the aperture of the cannula from contamination. (Messrs. Mayer & Phelps, New Cavendish Street, W.1.)

Metal Bottle with Screw Cap.—This is a most convenient bottle for the surgical case or midwifery bag, as spirit or lysol can be carried with safety, and the size is convenient. Price 3s. 9d. (Messrs. A. E. Braid & Co. Ltd.)

Mouth and Throat Lamp (Electric).—This instrument is essentially a tongue depressor, the handle of which is a dry battery, the depressor itself consisting of a flat piece of wood held in position by a slot. It is so arranged that, as the tongue is depressed, an electric light illuminates the mouth, and this is extinguished the moment the pressure is removed. For quickly examining the throat, nothing could be better, and no washing or sterilizing of the instrument is required, as a fresh piece of wood is used in each case. The blades cost 2s. for 50. The instrument folds up so that it can be easily carried in the pocket. We can cordially recommend it. (Messrs. A. E. Braid & Co. Ltd.)

Mouth Gag.—In a new mouth gag sent to us the ratchet is separate from the spring, which is double, and much stronger than those of the usual pattern. This is a most efficient instrument. (Messrs. R. Sumner & Co. Ltd., Liverpool.)

Mouth Gag (de Caux-Davis').—This gag combines a gag and tongue contractor (*Fig. 122*), and is constructed on the principle of a hanging laryngoscopy apparatus. It consists of a frame and five different sized spatulas, so that it can be used for adults or children, and gives a more perfect view of the tonsils than can be obtained by other gags. Each blade is fitted with a blood-suction tube. Recently, at the suggestion of Dr. de Caux, anaesthetist, St. Bartholomew's Hospital, the gag has been improved by making the spatulas with the suction pipe embedded, which gives a better view. (The Holborn Surgical Instrument Co. Ltd.)

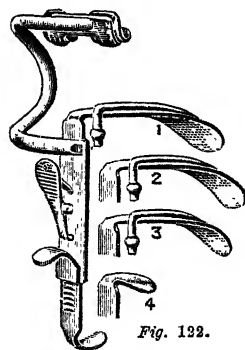


Fig. 122.

Myomectomy Forceps (Victor Bonney's).—This (*Fig. 123*) is a hæmostatic forceps used for clamping the cervix, enabling tumours of the uterus to be removed bloodlessly. Messrs. Allen & Hanburys Ltd. are the manufacturers.

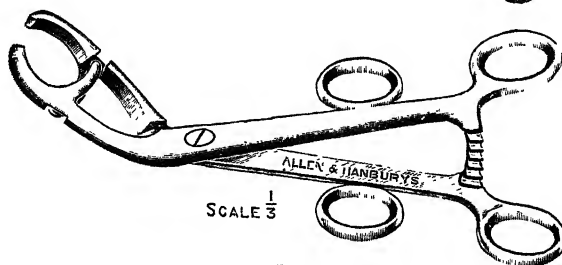


Fig. 123.

Nasal Dilator.—The illustration (*Fig. 124*) shows a simple form of dilator, designed by Mr. Flemming, of Bristol, which is retained in position by the shoulders engaging in the vestibula, and the lugs preventing the alæ nasi from contracting. Its chief value is in the administration of nasal gas, where it greatly diminishes the tendency for nasal to replace oral breathing during induction. (Messrs. Down Bros. Ltd., 21 & 23, St. Thomas's Street, S.E.)

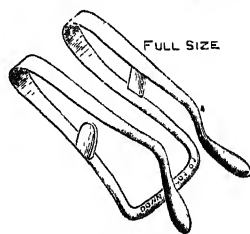


Fig. 124.

Operating Aprons.—These are made from waterproof material, with silk finish (not india rubber), which can be sterilized either by steam or by boiling. Very light in weight. (Messrs. Allen & Hanburys Ltd.)

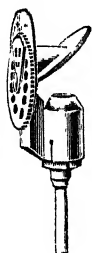


Fig. 125.

Ophthalmoscope (Electrical). —

This is a new simple pattern for the use of the general practitioner, complete with the battery in the handle, in a leather case, price £3 3s. 0d. (Messrs. Allen & Hanburys Ltd.)

A The Electric Illuminator, for use with Morton's ophthalmoscope, is a simple attachment devised by Dr. Lockhart for converting the ordinary Morton's ophthalmoscope into an electrically illuminated instrument. (Messrs. Allen & Hanburys Ltd.)

Pantoscope Accessories.—Two new and very useful accessories, A and B (*Fig. 125*) have now been added to the Holborn Pantoscope, which was described in our 1923 volume.

A is an ophthalmoscope fitting containing lenses - 20 to x plus, price 35s., and B is a vulcanite cap and mount for transillumination, price 3s. 6d. (Messrs. The Holborn Surgical Instrument Co. Ltd.)

Pessary.—The 'Chiron' ring pessary (*Fig. 126*) is formed of a cushion of spongy rubber with a smooth surface. It has no metal spring, yet it gives the necessary support. It is lighter and more resilient than the ordinary watch-spring pessary, and is in consequence more comfortable for the patient. Made in 13 sizes, at 12s. per dozen. (Messrs. Mayer & Phelps.)



Fig. 126.

Pump and Suction Apparatus (Mennell's).—A convenient form of apparatus (*Figs. 127, 128*) for supplying air in intratracheal anaesthesia or any other purpose. The same apparatus can also be used for suction. It consists of a small electric motor, suitable for use on any main electric supply, and it is coupled to a centrifugal pump. The whole apparatus, complete with resistance to regulate the speed, is contained in a metal case, size 11 × 5 × 6 in., weight only 10 lb. (Messrs. Allen & Hanburys Ltd.)

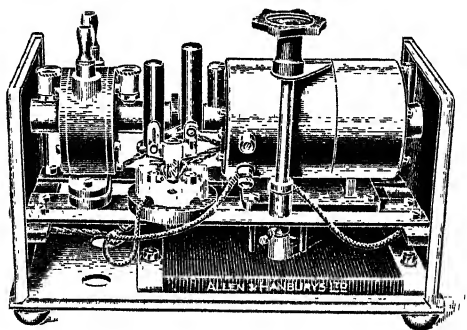


Fig. 127.

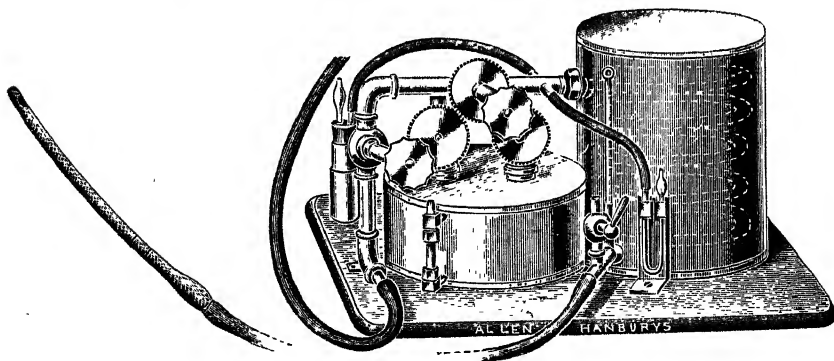


Fig. 128

Radium Application Forceps.—Mr. C. P. G. Wakeley finds that the insertion of tubes containing radium is not always quite so simple a matter as may appear at first sight, especially when there is any resistance to be overcome, as in the case of fibroid tumours. In such cases it only too frequently happens that the radium appli-

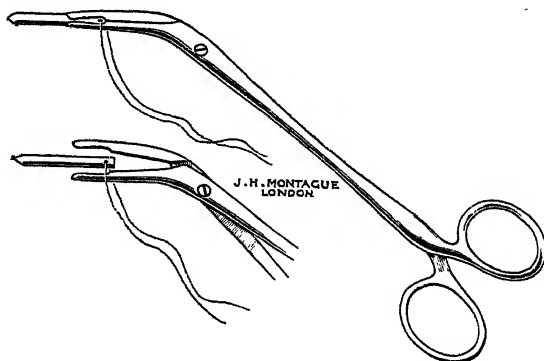


Fig. 129

cator is seized with Spencer Wells forceps, with the inevitable result that the tube is damaged. The forceps shown (*Fig. 129*) holds the radium tube firmly without allowing of lateral movement; the tube therefore cannot be scratched or otherwise damaged. (Mr. J. H. Montague, 69, New Bond Street, W.1.)

Sphygmo-oscillometer (The 'Serlon').—The general construction of this valuable instrument will be understood from the illustrations (*Fig. 130*). It is designed not only to give a magnified measurement of arterial pulsation, but also enables the systolic and diastolic pressure to be ascertained. This is easily observed by the oscillation

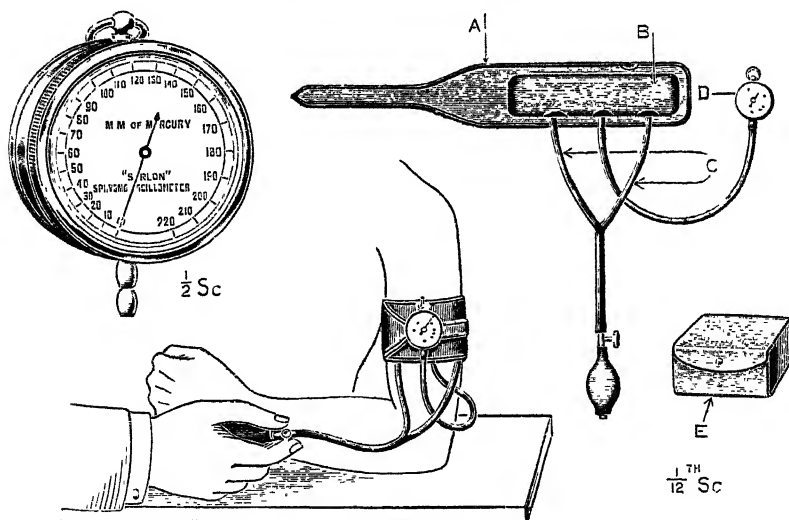


Fig. 130.

of the needle. Instead of having to maintain the finger on the pulse to mark the point at which it is obliterated, this can be ascertained by watching the needle and marking the point where it ceases to oscillate. We think most practitioners will prefer to use the eye and the finger conjointly.

The instrument has many features which recommend it as most serviceable for examining blood-pressure, and it can be packed into a case $5\frac{1}{2} \times 3\frac{1}{2} \times 2\frac{1}{2}$ inches, which makes it portable. We can recommend it after careful trial of its efficiency. (Messrs. A. E. Braid & Co. Ltd.)

Spheno-palatine Syringe and Needle.—The injection of alcohol into the spheno-palatine ganglion, as suggested by Sluder, is now widely adopted in the treatment of certain types of neuralgia. Owing to the position of the ganglion, behind the posterior end of the middle turbinal, it can only be accurately punctured by a needle of special design. The syringe and needle here illustrated (*Fig. 131*) have been found 'very' satisfactory in a number of cases by Dr. Douglas Guthrie. (Messrs. Mayer and Phelps.)

Sterilizer (Portable).—The 'Brawoodine' Portable Sterilizer ($4\frac{1}{2} \times 2\frac{3}{4} \times 1\frac{3}{4}$ in.) is intended for hypodermic syringes, etc. It is of stamped-out metal, nickel-plated, with folding legs, perforated metal tray, and lifters. Complete with spirit lamp, price 13s. 6d. (Messrs. A. E. Braid & Co. Ltd.)

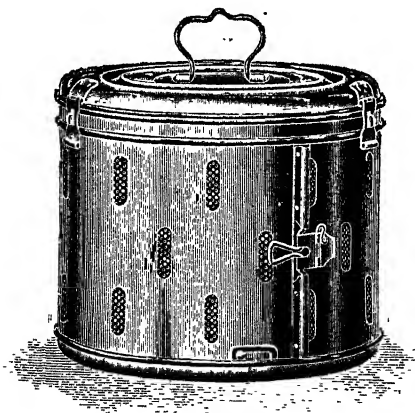


Fig. 132.

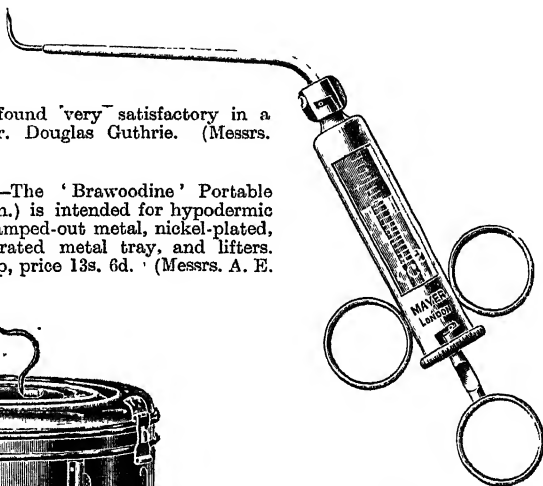


Fig. 131.

Sterilizing Drums ('Brawoodine').—These drums (*Fig. 132*) are far superior to the usual style owing to the top and bottom being rounded, so as to give a smooth surface similar to a bowl. The outer band is fitted with a spring catch to fasten it securely when the perforations are covered, and when released the band can be revolved quite freely. The band is also removable for cleaning purposes. They are supplied by Messrs. A. E. Braid & Co. Ltd.

Staff for Perineal Section.—The instrument illustrated (*Fig. 133*), for external urethrotomy, is made by Messrs. Down Bros. Ltd., under the instructions of Mr. G. H.

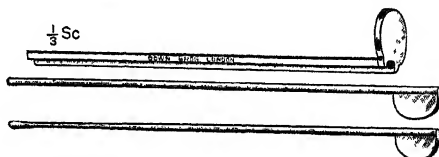


Fig. 133.

Edington, of Glasgow. The chief features are that the fine straight bougie acts as a guide for the staff, which has a groove along the whole length of its under-surface, which can be appreciated by the finger on the perineum.

Staple and Holder for Hernia.—This staple (*Fig. 134*) is used by Mr. Alex. MacLennan in the cure of femoral hernia, where it has been found invariably satisfactory. The

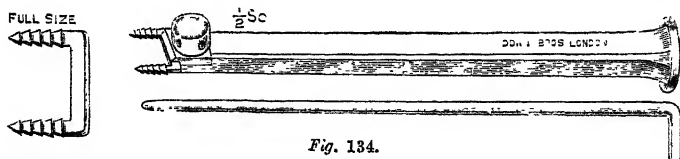


Fig. 134.

construction of the staple and holder allows the staple points to be accurately placed across Poupart's ligament and hammered into the ramus of the pubis. A slight relaxation of the capstan screw by the rod releases the staple. The fluting of the staple prevents it again working loose. Messrs. Down Bros. Ltd. are the manufacturers.

Stethoscope Chest-piece.—This combination (*Fig. 135*) is made by Messrs. Reynolds & Branson Ltd., of Leeds. The main portion is bell-shaped, gradually curving to the tubes. It is fitted with a vulcanite rim. There are also provided a phonendoscope mount having detachable metal cover, and the proximal end of a Teske chest-piece. Price complete, 17s. 6d.

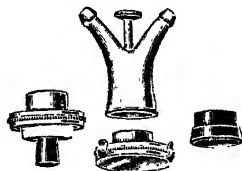


Fig. 135.

Suction and Pressure (Rotary Pump for).—We illustrate (*Fig. 136*) a convenient pump for pressure and suction which is very useful in all throat and internal nasal opera-

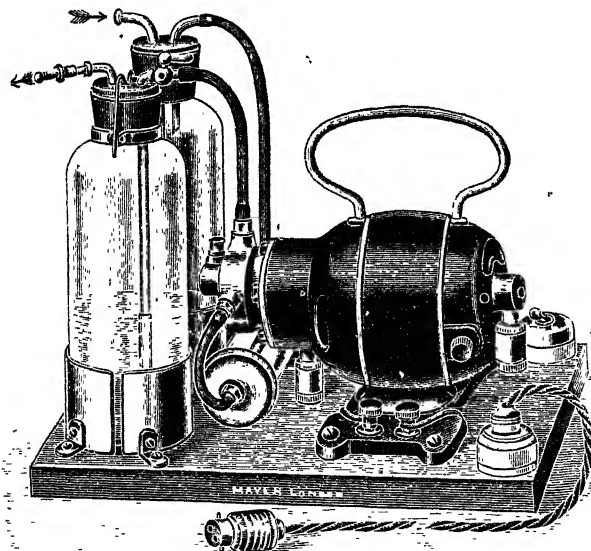


Fig. 136.

tions. It is designed by Mr. C. K. Moseley, of Ipswich. Messrs. Mayer & Phelps are the manufacturers, from whom all particulars can be obtained.

Stomach Clamp (Kocher-Payr).—This has very elastic blades with round knobs (*Fig. 137*). The knobs engage into the tissue and prevent it slipping. A short pin



Fig. 137.

on the top of one blade engages in a corresponding hole in the other blade, thus preventing the two branches from over-riding. (The Holborn Surgical Instrument Co. Ltd.)

Thermometers (Re-setting Case for).—Messrs. G. H. Zeal Ltd., 77, St. John Street, E.C.1, have sent us an appliance for quickly re-setting the index of the thermometer after use, called the 'Acello' re-setting ease. Its mechanism will be readily understood from the illustration (*Fig. 138*), and we think its use in hospital wards would be a great convenience. We should admire the appliance for use in daily practice still

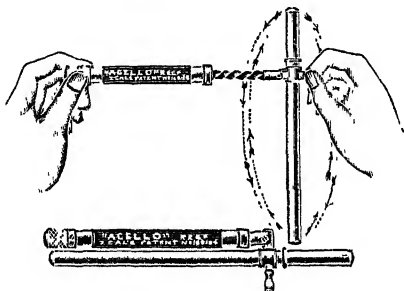


Fig. 138.

more, if no thermometer had ever been invented the index of which could be instantly replaced. For many years we used such an instrument and we were delighted with it. It was called the 'Repello' thermometer, and Messrs. G. H. Zeal Ltd. were the manufacturers. We suppose that they have to meet the requirements of those who buy the cheaper instruments. We prefer the 'Repello'.

Thomas Caliper (Modified).—Mr. George Sacks has devised a modification (*Fig. 139*) of the ordinary Thomas's splint for fracture of the femur, which has proved useful in correcting displacements which have persisted after reduction of the fracture and fixation by extension. The alterations consist in the addition of an extra vertical bar

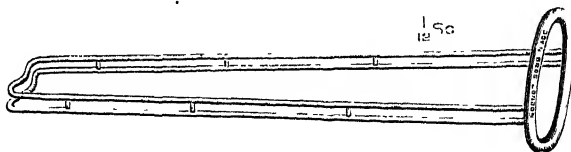


Fig. 139.

fixed to the ring of the splint. The two bars are kept apart by small struts. The limb is supported on one, and, by suitably arranging bandages on the upper bar, any lateral or posterior displacement may be corrected. (Messrs. Down Bros. Ltd., St. Thomas's Street, S.E.)

Tongue Depressor.—Messrs. A. E. Braid & Co. Ltd. supply a tongue depressor of metal, nickel plated, for fitting on to the 'Ever Ready' electric fountain pocket lamp. It is a very convenient form of depressor, and costs 2s. 3d.

Tonsil Bed Compressor.—These forceps (*Fig. 140*) have been designed by Dr. Gushue-Taylor for exerting pressure on the base of the tonsils after enucleation, so as effectively to control hæmorrhage. Messrs. Mayer & Phelps are the manufacturers.

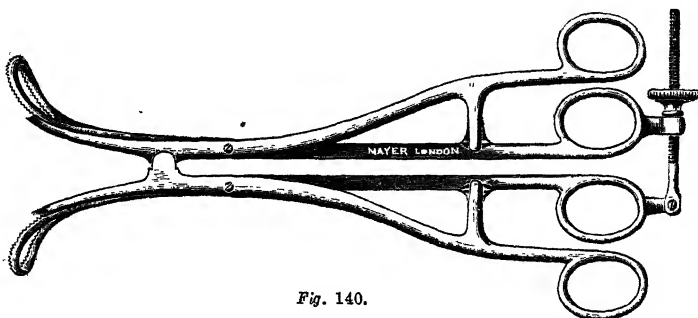


Fig. 140.

Tooth Forceps (Children's).—Messrs. R. Sumner & Co. Ltd. supply a set of four tooth forceps, in case, for children (*Fig. 141*). This is very useful for a general practitioner, as the instruments for children's teeth are by this means always kept together and ready for use. Also the instruments, being small, can be held in the hand without being seen by the children. The instruments are well made and will prove highly efficient.

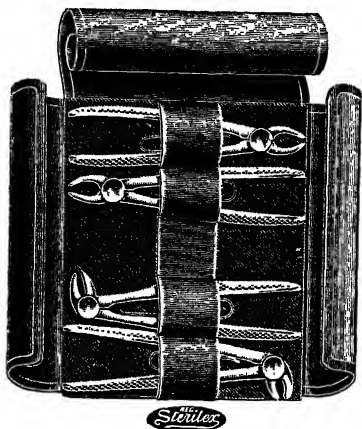


Fig. 141

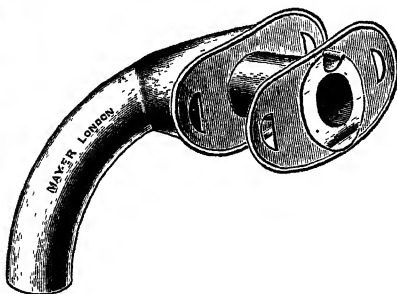


Fig. 142.

Tracheal Cannula.—This is intended for use after laryngectomy. It will be seen that the diameter of the tube increases before it reaches the shield (*Fig. 142*); this keeps the orifice of the trachea from contracting. The second shield is intended to keep the dressing in place. The nursing is much facilitated by the use of this cannula, as the inner tube comes right up to the surface of the second shield and can be taken out for cleaning and be replaced without any difficulty. The instrument is a modification by Professor E. J. Moure (Bordeaux) of Lombard's tube. Made in two sizes by Messrs. Mayer & Phelps.

Urethroscope (Cauterizing).—By means of this instrument (*Fig. 143*) one is able to illuminate and inflate the urethra, locate the object to be cauterized, place the platinum point directly on it, bring to a dull-red heat, and clearly observe the entire operation. Thus one can be certain that treatment has been carried out successfully. The

instrument is practically the same as the operating urethroscope, but in place of the metal handle it has one made of vulcanite, into which the cautery points are screwed,

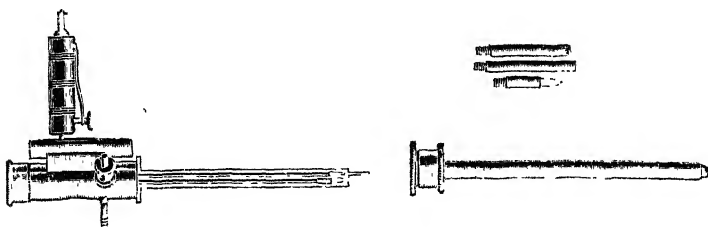


Fig. 143.

and a make-and-break switch for turning the current off and on. (The Holborn Surgical Instrument Co. Ltd.)

Aero-urethroscope.—In this instrument, suggested by Colonel L. W. Harrison, the lamp stem is carried in a *separate tube* attached to the long side of the urethral tube. This ensures a perfectly clear view. The illustration (Fig. 144) shows A, the instrument as

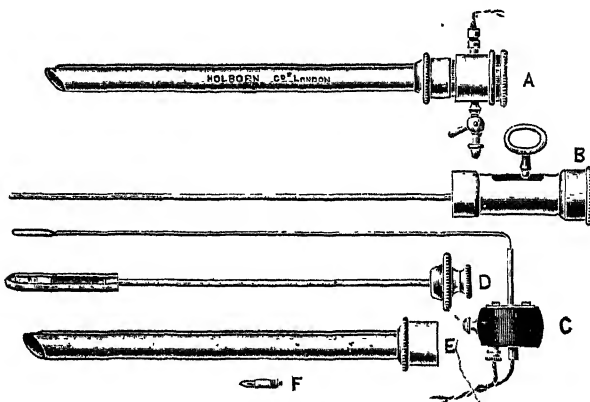


Fig. 144.

used for examining; B, the operation attachment into which a probe is fixed; C, a cautery attachment; D, and E, the pilot and urethral tubes; and F, a spare lamp. The urethroscope with cannula and operating attachment weighs 2½ oz. (The Holborn Surgical Instrument Co. Ltd.)

Cysto-urethroscope (Ringleb's).—This is a new model claiming advantages over other patterns. Designed by Professor Ringleb and fitted with Zeiss optical system. (Messrs. Allen & Hanburys Ltd., Wignore Street, W.1.)

Uterus Drainage Instruments.—This is a set of instruments (Fig. 145) suggested by Dr. Remington Hobbs for use in the drainage of the uterus in the treatment of acute infections of the endometrium, which are frequently associated with salpingitis, pelvic peritonitis, and septicæmia. It includes:—

1. A Modified Sims' speculum for introduction into the posterior fornix;
2. An Anterior vaginal wall retractor consisting of a flat metal spatula with specially designed oblique ends of a different size. One end is introduced into the anterior fornix and held obliquely in order to lie parallel to the vaginal wall. By a series of gentle movements it is easy, with a Sims' speculum, to manipulate the cervix into a central position;
3. A catheter introducer: a light, handy instrument which owing to its size, and the curve in its shank, does not obscure the line of vision of the catheter. When the

catheter has been inserted the lumen of the tube is not obliterated, so that sterilized glycerin, which is used in these acute infections, can be syringed into the uterus, whilst the tube is retained *in situ* by the holder; and

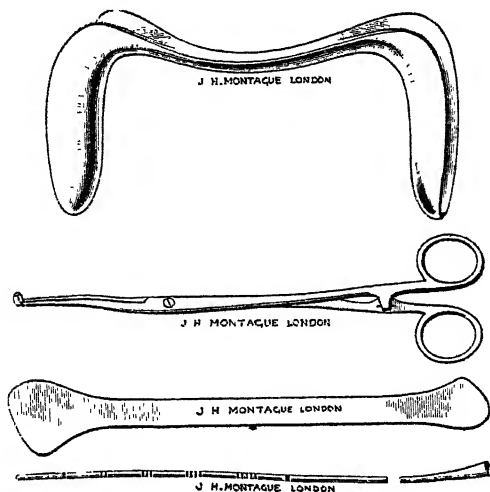


Fig. 145.

4. **Terminal-eyed catheters** which are specially made of varying sizes to pass easily through the cervical canal without causing damage. They are graduated in inches, and by this means the length of catheter introduced can be judged by the operator. (Mr. J. H. Montague, 69, New Bond Street, W.1.)

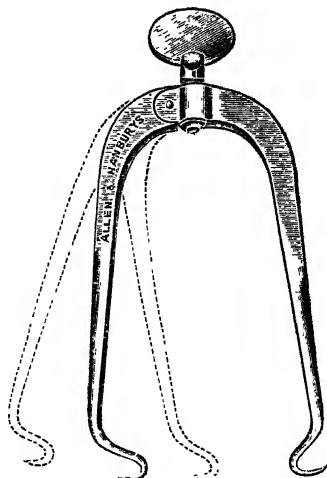


Fig. 146.

Vulva Retractor (Comyns Berkeley's).—This instrument (Fig. 146) greatly facilitates plastic operations on the vagina. (Messrs. Allen & Hanburys Ltd.)

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Springfield House Mental Hospital, near Bedford. 1 hour from London. Better class only received. Separate bedrooms. Ordinary terms 5 guineas. Res. Med. Supts., David Bower and Cedric W. Bower. Bedford, $1\frac{1}{2}$ miles, L.M. & S.R. Tel. No. 17. *See also Advt., p. 105*

Belfast.—*Belfast District Lunatic Asylum.* Res. Med. Supt., Dr. S. J. Graham.

Beverley.—*East Riding of Yorkshire County Mental Hospital.* Res. Med. Supt., E. S. Simpson, M.C., M.D. Beverley station, 2 miles.

Birmingham.—*Rubery Hill and Hollymoor Mental Hospital.* Res. Med. Supt., T. C. Graves, M.D. Rubery station. *Birmingham City Mental Hospital,* Winson Green. Res. Med. Supt., Dr. C. B. Roscrow. Winson Green, $\frac{1}{2}$ mile; Soho, $\frac{1}{2}$ mile.

Bodmin.—*Cornwall County Mental Hospital.* Res. Med. Supt., Dr. Francis Dudley. Bodmin station, G.W.R. and S.R.

Box (Wilts.).—*Kingsdown House,* 5 miles from Bath. Res. Med. Supts., Dr. H. C. MacBryan and Dr. J. V. Blachford. *See also Advt., p. 102*

Brentwood.—*Brentwood Mental Hospital.* Res. Med. Supt., W. Robinson, M.D. Brentwood station, $\frac{1}{2}$ mile.

Littleton Hall, Brentwood, Essex (for ladies). Med. Licensee, Dr. H. E. Haynes. Brentwood and Shenfield, $1\frac{1}{2}$ miles.

Bridgend.—*Glamorgan County Mental Hospital.* Res. Med. Supt., D. Finlay, M.D. Bridgend, $1\frac{1}{2}$ miles.

Bristol (near).—*Brislington House.* Proprietress, Mrs. Bonville Fox. Res. Physician, Dr. J. M. Rutherford. Bristol, 3 miles. *See also Advt., p. 101*

Bristol Mental Hospital, Fishponds. Res. Med. Supt., Dr. E. B. C. White, Clerk and Steward, A. W. King. Fishponds station, 1 mile.

Northwoods House, Winterbourne, 7 miles from Bristol. Res. Med. Props. and Licensees, J. D. Thomas, B.A., M.B., B.C., and J. R. P. Phillips, O.B.E., M.R.C.S., L.R.C.P. Taxicab from Bristol, Fishponds, Winterbourne, or Patchway stations. *See also Advt., p. 106*

Bromsgrove (Worcs.).—Worcestershire Mental Hospital, "Barnsley Hall". Res. Med. Supt., Dr. P. T. Hughes. Broms. grove, L.M. & S.R. 2½ miles. *See also Advt., p. 101*

Burgess Hill (Sussex).—St. George's Retreat. Licensee, Miss Mary Doran. Med. Supt., Dr. R. D. Pennefather. Wivelsfield, 1½ miles; Burgess Hill station, 2 miles.

Burley-in-Wharfedale (Yorks.).—West Riding Asylum, Scalebar Park. Res. Med. Supt., Dr. J. R. Gilmour. Burley-in-Wharfedale station, L.M. & S.R., ¼ mile.

Bury, (Lancs.).—Oaklands, Walmersley, (home for ladies). Res. Med. Supt., Dr. Philip G. Mould. Bury station, 2 miles. *See also Advt., p. 103*

Buxton.—Wye House. Res. Med. Supt., W. W. Horton, M.D. Buxton, L. & N.W.R. and L.M. & S.R., 10 minutes. *See also Advt., p. 108*

Caerleon (Mon.).—Newport Borough Mental Hospital. Res. Med. Supt., W. F. Nelis, M.D. Caerleon, ¼ mile.

Cambridge.—County Mental Hospital, Fulbourn. Res. Med. Supt., Dr. A. F. Reardon. Cambridge station, 3 miles.

Canterbury.—Stone House, St. Martin's. Res. Med. Supt., Dr. E. F. Sall. Canterbury East.

Cardiff.—Cardiff City Mental Hospital, Whitechurch. Res. Med. Supt., E. Goodall, C.B.E., M.D. Llandaff, G.W.R., 1 mile.

Carlisle.—Cumberland & Westmorland Mental Hospital. Res. Med. Supt., W. F. Farquharson, M.D. Carlisle, 3 miles.

Carlow.—District Asylum. Res. Med. Supt., Dr. T. A. Greene. Carlow, ¼ mile.

Carmarthen.—Joint Counties Mental Hospital. Res. Med. Supt., J. Richards, M.A., F.R.C.S.E. Carmarthen, 2 miles.

Castlebar (Co. Mayo).—Co. Mayo Mental Hospital. Res. Med. Supt., F. C. Ellison, M.D. Castlebar, 1 mile.

Chartham (near Canterbury).—Kent County Mental Hospital. Res. Med. Supt., M. A. Collins, M.D. Chartham, 1 mile; Canterbury, 3 miles.

Cheadle (Cheshire).—Cheadle Royal Mental Hospital. Res. Med. Supt., J. A. C. Roy, M.B., ChB Heald Green, 1 mile. *See also Advt., p. 100*

Chester.—Cheshire County Mental Hospital. Res. Med. Supt., G. Hamilton Grills, M.D. Chester station, 1½ miles.

Chichester.—West Sussex Mental Hospital, Graylingwell. Res. Med. Supt., Dr. H. A. Kidd, C.B.E. Chichester station, 1½ miles.

Church Stretton.—Stretton House. Near Shrewsbury, Shropshire (for gentlemen). Res. Med. Supt., Col. A. A. Watson, C.M.G., D.S.O. Church Stretton station, ¼ mile. *See also Advt., p. 97*

The Grove House, All Stretton, Shropshire (for ladies). Res. Prop. and Med. Supt., Dr. J. McClintock.

Clonmel.—District Mental Hospital. Res. Med. Supt., Dr. Bagenal C. Harvey. Clonmel, 1 mile.

Colchester.—Essex and Colchester Mental Hospital, Severalls. Res. Med. Supt., Dr. R. C. Turnbull. Colchester, 1½ miles.

Cork.—Cork District Mental Hospital. Res. Med. Supt., Dr. O. F. McCarthy. Cork, 2½ miles.

Lindville, Cork. Prop., Mrs. Osburne.

Cupar (Fifeshire).—Fife and Kinross District Asylum. Res. Med. Supt., James H. Skeen, M.B. Springfield station, N.B.R., ¼ mile.

Darlington (Durham).—Middleton Hall, Middleton St. George. Res. Med. Supt., L. Harris-Liston, M.D. Dinsdale station, 1 mile.

Dartford (Kent).—City of London Mental Hospital, near Dartford. Res. Med. Supt., Dr. R. H. Steen. Dartford, S.E.R., 2 miles.

Denbigh (North Wales).—North Wales Counties Asylum. Med. Supt., Frank G. Jones, M.D. Denbigh, 1 mile.

Derby.—Borough Mental Hospital, Rowditch. Res. Med. Supt., Dr. John Bain, L. & N.E.R. station, 1 mile; L.M. & S.R., 2 miles. *See also Advt., p. 104*

The County Asylum, Mickleover, Derby. Res. Med. Supt., Dr. G. N. Bartlett, Derby, L.M. & S.R., 5 miles; Mickleover, L. & N.E.R., 2 miles.

Devizes.—Wilts County Asylum. Res. Med. Supt., S. J. Cole, M.D. Devizes, 1 mile.

Dorchester.—Dorset Mental Hospital. Res. Med. Supt., G. E. Peachell, M.D. Dorchester, 3 miles.

Downpatrick.—Down District Asylum. Res. Med. Supt., M. J. Nolan, L.R.C.P.I. and L. M. Downpatrick, 1 mile.

Dublin.—Bloomfield, Morehampton Rd. Med. Off., H. T. Bewley, M.D. Dublin, 1 mile.

Farnham House and Maryville, Finglas, Dublin. Res. Med. Supt., H. P. D'Arcy Benson, M.D. Cab from Dublin, 2 miles.

Grangegorman Mental Hospital, Dublin. Res. Med. Supt., Dr. J. O'Connor Donelan; also *Portrane Branch*, Donabate, Dublin. Dep. Res. Med. Supt., Miss E. L. Fleury, M.D. Donabate station, 1 mile.

Highfield (for ladies), Drumcondra; **Hampstead** (for gentlemen), Glasnevin. Res. Med. Supts., Hy. M. Eustace, B.A., M.D., and Wm. N. Eustace, L.R.C.P.I. & S.I. By rail, Dublin. See also *Advt.*, p. 97

House of St. John of God, Stillorgan, Dublin. Res. Phys., Dr. J. J. Boland. Stillorgan station, $\frac{1}{2}$ mile.

St. Patrick's Hospital, James's Street, Dublin. Res. Med. Supt., Dr. R. R. Leeper. Branch Asylum, *St. Edmondsbury*, at Lucan. See also *Advt.*, p. 94

St. Vincent's Asylum, Fairview, Dublin. Vis. Physicians, John Murphy, F.R.C.P.I., and F. X. Callaghan, F.R.C.P.I. Apply to the Superiress.

Stewart Institution, Palmerston, Chapelizod, Co. Dublin. Res. Med. Supt., G. H. Keene, M.D. Kingsbridge, $2\frac{1}{2}$ miles.

Verville Retreat, Clontarf, near Dublin. Prop., P. D. Sullivan, F.R.C.S.I.

Dudley (Stafford).—**Ashwood House**, Kingswinford. Props., Drs. Peacock and Pietersen. Res. Med. Supt., Dr. J. F. G. Pietersen. Stourbridge Junc., $3\frac{1}{2}$ miles; Dudley station, 4 miles; Wolverhampton, 7 miles. Tel.: 19 Kingswinford.

See also *Advt.*, p. 106

Dumfries.—**Crichton Royal**. Res. Med. Supt., Dr. C. C. Easterbrook. Dumfries, 1 mile.

Dundee.—**Baldovan Institution** (for the treatment and education of the feeble-minded). Res. Med. Supt., W. B. Drummond, F.R.C.P.E. Downfield, 1 mile; Dundee, $4\frac{1}{2}$ miles.

Dundee District Asylum, Westgreen, Dundee. Res. Med. Supt., W. Tuach-Mackenzie, M.D. Dundee, 3 miles; Liff, $1\frac{1}{2}$ miles.

Dundee Royal Asylum, **Gowrie House**, Dundee. Med. Off., A. B. Dalgetty, M.D. Sec., J. Wilkie, 20, Reform Street, Dundee.

Durham.—**County Asylum**, Winterton. Res. Med. Supt., Dr. H. G. Cribb. Sedgfield station, $2\frac{3}{4}$ miles, by bus.

Gateshead County Borough Mental Hospital, Stannington, Northumberland. Res. Med. Supt., Lt.-Col. J. V. G. B. Tighe, M.B. Stannington, N.E.R., $2\frac{1}{2}$ miles.

Sunderland Borough Mental Hospital, Ryhope, Durham. Res. Med. Supt., Dr. M. A. Archdale. Ryhope station, 1 mile.

Edinburgh.—**Edinburgh District Mental Hospital**, Bangour Village, West Lothian. Res. Med. Supt., J. Keay, M.D. 1 phall, N.B.Rly., 2 miles.

Midlothian and Peebles District Asylum. Res. Med. Supt., James H. C. Orr, M.D. Rosslynlee, 1 mile; Edinburgh, 12 miles.

New Saughton Hall, Polton, Edinburgh. Res. Med. Supt., S. R. Macphail, M.D. Edin. Polton, 5 minutes; Loanhead, 10 minutes' walk. See also *Advt.*, p. 98

Royal Edinburgh Asylum, Morningside. Res. Phys. Supt., Professor George Robert son. Edinburgh, $1\frac{1}{2}$ miles.

Elgin.—**Morayshire District Asylum**. Res. Supt., Miss Anne A. Kinloch. Vis. Med. Off., Dr. D. G. Campbell. Elgin, $1\frac{1}{2}$ miles.

Ennis.—**Clave Mental Hospital**. Res. Med. Supt., Dr. F. O'Mara. Ennis, 2 miles.

Enniscorthy (Co. Wexford).—**District Lunatic Asylum**. Res. Med. Supt., Dr. H. T. J. Kennedy. Enniscorthy, 1 mile.

Epsom (Surrey).—**The Silver Pines**, Church Street (for ladies). Licensees, Miss Daniel (Res.), Dr. E. G. C. Daniel. L. & S.W.R. and L.B. & S.C.R., 5 minutes. Tel.: 346 P.O. Epsom. See also *Advt.*, p. 108

Exeter.—**City Mental Hospital**. Digbys, Heavitree. Res. Med. Supt., D. McKinlay Reid, M.D. Exeter, 3 miles.

See also *Advt.*, p. 107

Court Hall, Kenton, near Exeter. Res. Licensees, Miss Mules, M.D., B.S., and Miss A. S. Mules, M.R.C.S. Starcross, 1 mile.

Devon Mental Hospital, Exminster. Res. Med. Supt., Richard Eager, O.B.E., M.D. Exminster, $1\frac{1}{2}$ miles; Exeter, 4 miles.

Wonford House Hospital for the Insane, Exeter. Res. Med. Supt., W. B. Morton, M.D. Exeter station (Queen St.) $1\frac{1}{2}$ miles; (St. David's), 2 miles.

Fairford (Gloucestershire).—**Fairford Retreat**. Res. Med. Supt. and Prop., Dr. A. C. King-Turner. Fairford, 1 mile.

Fareham (Hants.).—**Knowle Mental Hospital**. Res. Med. Supt., Dr. J. L. Jackson. Knowle, $\frac{1}{2}$ mile.

Glasgow.—**District Mental Hospital**, Woodilee. Res. Med. Supt., H. Carre, L.R.C.P. & S. Lenzie station, 1 mile; Glasgow, 8 miles.

Glasgow District Hospital for Mental Diseases, Gartloch. Res. Med. Supt., W. A. Parker, M.B. Garnkirk station, 1 mile.

Glasgow Royal Mental Hospital, Gartnavel. Res. Med. Supt., D. K. Henderson, M.D.

Govan District Asylum, Hawkhead, Glasgow. Res. Med. Supt., Dr. J. H. MacDonald. Crookston station.

Kirklands Mental Hospital, Bothwell, Glasgow. Res. Med. Supt., Wm. M. Buchanan, M.B. Bothwell and Fallside stations, $\frac{1}{2}$ mile; Glasgow, 9 miles.

Lanark District Asylum, Hartwood, Lanarkshire. Res. Med. Supt., Dr. N. T. Kerr. Hartwood station, $\frac{1}{2}$ mile.

Smithston Asylum, Greenock. Res. Med. Supt., Wm. Leggett, M.D. Greenock West, $1\frac{1}{2}$ miles; Ravenscraig, $\frac{1}{2}$ mile.

Gloucester.—**Barnwood House**. Res. Med. Supt., Arthur A. D. Townsend, M.D. Gloucester, 2 miles. See also *Advt.*, p. 167

Gloucester County Mental Hospitals, Wotton and Barnwood, Gloucester. Res. Med. Supt., Dr. J. Marnan. Gloucester station, 1 mile.

Guernsey.—**St. Peter Port Asylum**. Med. Off., E. K. Corbin. M.R.C.S.

Haddington, N.B.—**East Lothian District Asylum**. Supt., Miss Jean Sinclair. Med. Off., H. H. Roberts, M.D. Haddington station, 10 minutes.

Hatton (near Warwick).—**County Mental Hospital**. Res. Med. Supt., A. Miller, M.B. Also **Leigh House**, for private patients. Hatton, G.W.R. station, 2 miles; Warwick, 3 miles.

Haywards Heath.—**Brighton County Borough Mental Hospital**. Res. Med. Supt., G. H. Harper-Smith, M.A., M.D. Haywards Heath, $1\frac{1}{2}$ miles.

Hellingly.—**East Sussex County Mental Hospital**, near Eastbourne. Res. Med. Supt., F. R. P. Taylor, M.D., B.S. Hellingly, 1 mile. See also *Advt.*, p. 96

Henley-in-Arden (Warwickshire).—**Glen-dossill** (for both sexes). Res. Med. Supt., Dr. W. Agar. Henley-in-Arden, G.W.R., $\frac{3}{4}$ mile.

Hereford.—**Hereford County and City Mental Hospital**. Res. Med. Supt., J. G. Smith, M.D. Barrs Court, G.W., L.M. & S., and L. & N.W.R., Hereford, 3 miles.

Huddersfield (near).—**West Riding Asylum**, "Storches Hall," Kirkburton. Res. Med. Supt., T. S. Adair, M.D. Kirkburton, L. & N.W.R., 1 mile.

Hull.—**City Asylum**. Res. Med. Supt., J. Merson, M.D. Willerby station, 1 mile; Hull, 6 miles.

Inverness.—**District Asylum**. Res. Med. Supt., T. C. Mackenzie, M.D. Inverness, $2\frac{1}{2}$ miles.

Ipswich.—**Borough Mental Hospital**. Res. Med. Supt., Dr. W. M. Ogilvie. Ipswich, 2 miles.

Isle of Man.—**Mental Hospital**, Union Mills, Douglas. Res. Med. Supt., Leslie H. Skene, M.C., M.B., Ch.B. Union Mills, $\frac{1}{2}$ mile.

Isle of Wight.—**The County Asylum**, Whitecroft. Res. Med. Supt., W. J. A. Erskine, M.D. Blackwater, $\frac{3}{4}$ mile; or Newport, $2\frac{1}{2}$ miles.

Isleworth (Middlesex).—**Wyke House**. Res. Phys., G. W. Smith, O.B.E., M.B., Ch.B. (Edin.). Isleworth and Osterley stations, 1 mile. See also *Advt.*, p. 103

Ivybridge.—**Plymouth Mental Hospital**. Res. Med. Supt., Dr. Wm. Starkey. Bittaford, $\frac{1}{2}$ mile; Wrangton, G.W.R., $1\frac{1}{2}$ miles; Ivybridge, 3 miles.

Jersey.—**Cranbourne Hall**, Grouville. Licensee, Miss Taylor. Grouville, 2 minutes' walk.

Jersey Asylum. Res. Med. Supt., Julius Labey, M.R.C.S. Gorey Village, 1 mile.

Sans Souci, Anne Port, Jersey. Matron, Mrs. Macdonald.

See also *Advt.*, p. 84

Kilkenny.—**District Mental Hospital**, Kilkenny. Res. Med. Supt., Louis Buggy, L.R.C.P. Kilkenny station, $\frac{1}{2}$ mile.

Killarney.—**District Asylum**. Res. Med. Supt., E. W. Griffin, M.D. Killarney, $\frac{1}{2}$ mile.

Lancashire (near Newton-le-Willows).—**Haydock Lodge**, Private Mental Hospital. Res. Med. Prop., Dr. C. T. Street. Newton-le-Willows, 2 miles.

Lancaster.—**County Mental Hospital**. Res. Med. Supt., D. M. Cassidy, M.D. Lancaster, L. & N.W. and L.M. & S.R. stations, each $1\frac{1}{2}$ miles.

Larbert (Stirlingshire).—**The Royal Scottish National Institution** (for education of imbecile children). Res. Med. Supt., Dr. R. D. Clarkson. Larbert station, 1 mile.

Leek (Stafford).—**County Mental Hospital**, Cheddleton. Med. Supt., W. F. Menzies, M.D. Wall Grango station, 1 mile.

Leicester.—**City Mental Hospital**, Humbersstone. Res. Med. Supt., J. F. Dixon, M.D. Humbersstone, L. & N.E.R., $\frac{1}{2}$ mile; Leicester, L. & N.E.R. & L.M. & S.R., 2 miles.

Leicestershire and Rutland Asylum. Res. Med. Supt., R. C. Stewart, M.R.C.S. Narborough, $\frac{1}{2}$ mile; Leicester, 6 miles.

Letterkenny.—**Tirconail Mental Hospital**. Res. Med. Supt., E. E. Moore, M.D. Letterkenny and Lough Swilly Rly., 1 mile.

Lichfield.—**County Mental Hospital**, Burntwood, near Lichfield. Res. Med. Supt., J. B. Spence, M.D. Lichfield City, $3\frac{1}{2}$ miles; Hammerwich, $1\frac{1}{2}$ miles.

Limerick.—**District Asylum**. Res. Med. Supt., Dr. P. J. Irwin. Limerick station, $\frac{1}{2}$ mile.

Lincoln.—*Bracebridge Mental Hospital.* Res. Med. Supt., John Macarthur, D.P.M. Lincoln, L. & N.E.R., 2½ miles.

The Lawn, Lincoln. Res. Med. Supt. Arthur P. Russell, M.B. Lincoln station, 1 mile. See also *Advt.*, p. 100

Liverpool.—*Shaftesbury House, Formby,* near Liverpool and Southport. Res. Med. Supt., Stanley A. Gill, M.D., M.R.C.P. Formby, ½ mile.

See also *Advt.*, p. 101

Tue Brook Villa, Liverpool, E. Res. Med. Supts., Drs. Tisdall and Moyes. Tue Brook station ¾ mile, or Green Lane car.

See also *Advt.*, p. 109

London.—*Bethlem Royal Hospital, Lambeth Road, London, S.E.* Phys. Supt., J. G. Porter Phillips, M.D., F.R.C.P.

See also *Advt.*, p. 93

Brooke House, Clapton, E. 5. Res. Med. Supt., Dr. Gerald Johnston. Clapton, G.E.R.

Camberwell House, 33, Peckham Road, S.E.5. Res. Med. Supt., F. H. Edwards, M.D., M.R.C.P. Asst. Med. Offs., H. J. Norman, M.B., Ch.B., D.P.H., R. L. Nuthall, M.R.C.S., and Miss M. T. McGeorge, M.B., Ch.B. Telegrams: "Psycholia, London." Telephone: New Cross 1057.

See also *Advt.*, p. 95

Chiswick House, Chiswick, W.4. Res. Lic., C. M. Tuke, M.R.C.S. Chiswick station, ½ mile; Turnham Green station, 1 mile.

Clarence Lodge, Clapham Park, S.W. 4. Prop., Mrs. F. Thwaites. Med. Off., Dr. Percy Smith. Clapham Road, and Clapham Common (Electric), 15 minutes. Tel. No. 494 Brixton. See also *Advt.*, p. 96

Featherstone Hall, Southall (for ladies). Res. Med. Lic., W. H. Bailey, M.D. Southall station, 5 minutes.

Fenstanton, Christchurch Road, Streatham Hill. Res. Med. Supt., J. H. Earls, M.D. Tulse Hill, 5 minutes; Streatham Hill, 10 minutes.

Flower House, Catford, S.E.6. Med. Supt., A. E. Price, M.D., M.S. Res. Lic., Major P. & Beckett. S.E. & C. Rly., Beckenham Hill, 5 minutes.

Halliford House, Sunbury-on-Thames, S.W. Res. Med. Supt., W. J. H. Haslett, M.R.C.S. Sunbury station, 1½ miles.

Hanwell Mental Hospital, Southall. Res. Med. Supt., A. W. Daniel, M.D.

Hayes Park, Hayes, Middlesex. Res. Med. Off., Dr. H. F. Stilwell. Hayes, 2 miles.

Hendon Grove Asylum (for ladies), Hendon, N.W. 4. Med. Lic., H. J. de Caux, L.M.S.S.A., L.S.A. (Lond.). By L.M. & S.R., Hendon station, ½ mile.

Horton Mental Hospital, Epsom. Med. Supt., Lt.-Col. J. R. Lord, C.B.E., M.B., C.M. S.R. 1½ miles, L.B. & S.C.R., 1½ miles.

London County Council, The Manor, Epsom. Res. Med. Supt., Dr. E. S. Littelljohn. S.R. and L.B. & S.C.R., 1½ miles.

London County Mental Hospital, Banstead Downs, near Sutton, Surrey. Res. Med. Supt., Dr. P. C. Spark. Belmont station, ½ mile; Sutton station, 1½ miles.

London County Mental Hospital, Bexley, Kent. Res. Med. Supt., G. Clarke, M.D. Bexley station, S.E.R., 1½ miles.

London County Mental Hospital, Cane Hill, Coulsdon, Surrey. Res. Med. Supt., Lt.-Col. S. C. Elgee, O.B.E., L.R.C.P. & L.R.C.S. (I.). Coulsdon South (Southern Rly., S.E. & C.R.), or Coulsdon North (L.B. & S.C.R. Section), 10 minutes.

London County Mental Hospital, Claybury, Woodford Bridge, Essex. Med. Supt., G. Foster Barham, M.D. Woodford Bridge station, G.E.R., 1½ miles.

See also *Advt.*, p. 109

London County Mental Hospital, Colney Hatch, N. Res. Med. Supt., S. J. Gillfillan, O.B.E., M.A., M.B. New Southgate, L. & N.E.R.

London County Mental Hospital, Long Grove, Epsom. Res. Med. Supt., D. Ogilvy, M.D. Southern Rly.

Meal House, Hayes (for ladies). Med. Licensees, Dr. H. F. Stilwell and Dr. R. J. Stilwell.

Moorcroft House, Hillingdon, Uxbridge, 2 miles. Med. Licensees, Mr. J. F. Stilwell, Dr. R. J. Stilwell and Dr. G. W. B. James. West Drayton station, 2 miles.

Newlands House, Tooting Bec Common, S.W. 17. Private Mental Hospital for 12 ladies and 16 gentlemen. Med. Supt., Dr. Noel Sergeant. Wandsworth Common, Balham and Streatham Hill stations, 1 mile. Motor bus Nos. 49, 49a, 49b, and 19a.

See also *Advt.*, p. 107

Northumberland House, Green Lanes, N. 4. Res. Med. Supt., Frederick Dillon, M.D. Finsbury Park station, 1 mile.

See also *Advt.*, p. 94

Otto House, 47, North End Road, West Kensington (for ladies). Lic. Prop., Mrs. Sutherland. Lady Supt., Miss Brodie. West Kensington station, 1 mile; Barons Court station (Piccadilly Tube), 1 mile.

See also *Advt.*, p. 96

Peckham House, 112, Peckham Road, S.E. Props., A. H. & H. G. Stocker. Res. Med. Supt., Dr. F. R. King. Peckham Rye station, 10 minutes' walk.

See also *Advt.*, p. 109

Springfield Mental Hospital, Tooting, S.W. 17. Med. Supt., R. Worth, O.B.E., M.B., B.S. Wandsworth Common station, 1 mile.

St. Luke's Hospital for Mental Diseases (re-building). Offices, 19, Nottingham Place, W.) See also *Advt.*, p. 59

The Priory, Roehampton, S.W., 15. Res. Med. Supt., James Chambers, M.D. Barnes station, 10 minutes.

West Ham Mental Hospital, Goodmayes, Essex. Res. Med. Supt., Dr. John Custance Shaw. Goodmayes, 1 mile.

Wood End House, Hayes (ladies). Med. Lic., Dr. R. J. Stilwell and Dr. C. W. B. James. Hayes station, 1 mile; Uxbridge, 3 miles.

Londonderry.—*District Asylum*. Res. Med. Supt., John Watson, M.C., M.B., B.Ch. Londonderry, 1 mile.

Macclesfield.—*Cheshire County Mental Hospital*, Parkside. Res. Med. Supt., H. Dove Cormac, M.B., M.S. Macclesfield, 1 mile.

Maldstone.—*Kent County Mental Hospital*. Res. Med. Supt., H. Wolseley-Lewis F.R.C.S., M.D. Maidstone West, 1½ miles.

Malling Place, West Malling, Kent. Res. Med. Supt., Dr. G. H. Adam. Malling station, 1 mile.

Market Lavington (Wilts.).—*Fiddington House*. Res. Med. Supt., J. R. Benson, F.R.C.S., F.R.C.P. Lavington, G.W.R., 1 mile; Devizes, 6 miles.

See also *Advt.*, p. 108

Maryborough (Queen's County).—*District Mental Hospital*. Res. Med. Supt., Dr. T. S. McClaughry. Maryborough, ½ mile.

Melrose, N.B.—*Roxburgh, Berwick, and Selkirk District Asylum*. Res. Med. Supt., Patrick Steele, M.D. Melrose, 1 mile.

Melton (Suffolk).—*St. Audry's Hospital for Mental Diseases*. Res. Med. Supt., J. R. Whitwell, M.B. Melton station, 1½ miles; Woodbridge station, 2½ miles.

Menston (near Leeds).—*West Riding Asylum*. Res. Med. Supt., S. Edgerley, M.D. Guiseley, 1 mile.

Merstham (Surrey).—*County Mental Hospital*, Netherne, near Coulsdon. Med. Supt., Dr. P. C. Coombes. Coulsdon station, 2 miles.

Middlesbro' (Yorks).—*Mental Hospital*. Res. Med. Supt., Dr. J. W. Geddes. Middlesbro', 2 miles.

Monaghan (Ireland).—*District Asylum*. Res. Med. Supt., Dr. T. P. Conlon. Monaghan, ½ mile.

Montrose, N.B.—*The Royal Asylum*. Res. Med. Supt., C. J. Shaw, M.D. Hillside, ½ mile; Dutton, 1 mile.

Morpeth.—*Northumberland Mental Hospital*. Res. Med. Supt., Guy R. East, V.D., D.P.H. Morpeth station, 1 mile.

Mullingar.—*District Asylum*. Res. Med. Supt., Dr. Laurence Gavin. Mullingar station, 1 mile.

Newcastle-on-Tyne.—*City Mental Hospital*, Gosforth. Res. Med. Supt., H. D. MacPhail, M.D. Newcastle, 4 miles.

Northampton.—*Berrywood Mental Hospital*. Res. Med. Supt., Dr. F. J. Stuart. L. & N.W. station, 2½ miles; L.M. & S.R. station, 3 miles.

St. Andrew's Hospital, Northampton. Med. Supt., D. F. Rambaut, M.A., M.D. Northampton station, 1 mile.

See also *Advt.*, p. 95

Norwich.—*Bethel Hospital for Mental Diseases*. Res. Med. Supt., S. J. Fielding, M.B. Cons. Phys., Saml. J. Barton, M.D. Norwich (Thorpe) station, 1 mile.

See also *Advt.*, p. 103

City of Norwich Mental Hospital, Hellesdon, near Norwich. Res. Phys. and Supt., Dr. David Rice. Hellesdon, 1 mile.

Heigham Hall, Norwich. Res. Med. Prop., J. G. Gordon-Munn, M.D. Res. Phys., Dr. G. Stevens Pope. Thorpe station, 1½ miles.

See also *Advt.*, p. 109

Norfolk County Mental Hospital, Thorpe, Norwich. Res. Med. Supt., O. G. Connell, M.C., L.R.C.P. & S. Whitlingham, 1 mile; Norwich, 2½ miles.

The Grove, Old Catton, near Norwich (for ladies). Vis. Phys., S. Barton, M.D. Apply to the Misses McLintock.

Nottingham.—*City Asylum*, Mapperley Hill. Res. Med. Supt., G. L. Brunton, M.D. Nottingham, 2 miles.

Notts County Mental Hospital, Nottingham. Res. Med. Supt., S. L. Jones, M.R.C.S. Radcliffe-on-Trent, 2 miles.

The Coppice, Nottingham. Res. Med. Supt., David Hunter, M.B. (Camb.). L.M. & S.R. station, 2½ miles; L. & N.-E.R. station, 1½ miles. See also *Advt.*, p. 98

Omagh.—*District Asylum*. Res. Med. Supt., Dr. John Patrick. Omagh, 2 miles.

Oxford.—*County and City Mental Hospital*, Littlemore. Res. Med. Supt., T. S. Good, O.B.E., M.R.C.S. Littlemore stat.

The Warneford, Oxford, 1½ miles. Res. Med. Supt., Alex. W. Neill, M.D. Oxford station, 2½ miles. See also *Advt.*, p. 100

Paisley.—*Craw Road Asylum*. Vis. Med. Off., H. C. Donald, F.R.C.S. Res. Med. Off., Miss Margaret L. Johnston, M.B. Paisley, 1 mile.

Paisley Mental Hospital, Riccartbar. Res. Med. Off., Dr. Mary R. Knight. Paisley West, ½ mile.

Renfrew District Asylum, Dykebar, Paisley. Res. Med. Supt., R. D. Hotchkis, M.D. Paisley, 2½ miles.

Perth.—*District Asylum*, Murthly. Res. Med. Supt., Lewis C. Bruce, M.C., M.D. Murthly station adjoins the Asylum.

James Murray's Royal Mental Hospital, Perth (for patients of the middle and upper classes). Phys. Supt., W. D. Chambers, M.A., M.D. (Edin.). Perth station, under 2 miles. *See also Advt., p. 105*

Plympton.—*Plympton House*, Plympton, South Devon. Res. Props., Dr. Alfred Turner and Dr. J. C. Nixon. Plympton, 1 mile; Marsh Mills, 2 miles; Plymouth, 5 miles. *See also Advt., p. 107*

Portsmouth.—*Borough Mental Hospital*. Res. Med. Supt., H. Devine, O.B.E., M.D. (Lond.). Clerk and Steward, John C. Kersey. Fratton, $\frac{1}{2}$ miles.

See also Advt., p. 97

Prestwich (near Manchester).—*County Mental Hospital*. Res. Med. Supt., Dr. D. Orr. Prestwich, $\frac{3}{4}$ mile.

Rainhill (nr. Liverpool).—*County Mental Hospital*. Res. Med. Supt., Dr. E. F. Reeve. St. Helens, $2\frac{1}{2}$ miles; Rainhill, 1 mile.

Rotherham (Yorkshire).—*The Grange*, 5 miles from Sheffield (for Ladies). Res. Phys., G. E. Mould, M.R.C.S., L.R.C.P. Grange Lane station, L. & N.E.R., $\frac{1}{2}$ mile. *See also Advt., p. 104*

St. Albans.—*Herts County Mental Hospital*, Hill End. Med. Supt., A. N. Boycott, M.D. Hill End station, L. & N.E.R., 3 minutes.

Napsbury Mental Hospital (under the Middlesex County Council), near St. Albans, Herts. Res. Med. Supt., L. W. Rolleston, M.B., B.S. Napsbury, L.M. & S.R., 5 minutes' walk.

St. Leonards-on-Sea.—*Ashbrook Hall*, Hollington (for ladies). Res. Lics., Mr. and Mrs. Charles E. H. Somerset. Warrior Square station, 2 miles.

Salisbury.—*Laverstock House*, Salisbury. Res. Med. Supt., J. R. Benson, F.R.C.S., F.R.C.P. Salisbury, $\frac{1}{4}$ miles.

See also Advt., p. 108

Old Manor Mental Hospital, near Salisbury. Med. Supt., Dr. S. E. Martin. Salisbury station, S.R. and G.W.R., 5 minutes.

Shrewsbury.—*Salop Mental Hospital*, Bicton Heath. Res. Med. Supt., W. S. Hughes, M.B., B.S. Shrewsbury station, $2\frac{1}{2}$ miles.

Sleaford.—*Kesteven County Asylum*. Res. Med. Supt., I. R. Macphail, L.R.C.P. & S. Rauceby, L. & N.E.R., $\frac{1}{4}$ mile.

Sligo.—*District Asylum*. Res. Med. Supt., Dr. P. O'Doherty. Sligo, $\frac{1}{4}$ miles.

Stafford.—*County Mental Hospital*. Res. Med. Supt., B. H. Shaw, M.D. Stafford, 1 mile.

Coton Hill Mental Hospital, Stafford. Res. Med. Supt., R. W. Hewson L.R.C.S. & P. (Edin.). Stafford, 1 mile.

Stirling.—*District Mental Hospital*, Larbert. Med. Supt., Dr. R. B. Campbell. Larbert, $1\frac{1}{2}$ miles.

Stone (near Aylesbury).—*Bucks Mental Hospital*. Res. Med. Supt., H. Kerr, M.D. Aylesbury, $3\frac{1}{2}$ miles. *See also Advt., p. 106*

Talgarth.—*Mid-Wales Counties Mental Hospital*, Res. Med. Supt., Dr. P. Drummond. Talgarth, 1 mile.

Tamworth (Staffs.).—*The Moat House* (for ladies). Res. Licensees, Claude Hollins, and Mrs. S. A. Michaux. Med. Attendant, Dr. Lowson. Tamworth station, $\frac{3}{4}$ mile.

Taunton.—*Somerset & Bath Asylum*, Cotford, near Taunton. Res. Med. Supt., Dr. H. T. S. Aveline. Norton Fitzwarren station, 2 miles.

Ticehurst (Sussex).—*Ticehurst House*. Res. Med. Supt., C. F. F. McDowall, M.D. Wadhurst, 4 miles, or Ticehurst Road, 3 miles.

Virginia Water.—*Holloway Sanatorium*, Hospital for the Insane, St. Ann's Heath. Res. Med. Supt., W. D. Moore, M.D. Asst. Med. Offs., T. E. Harper, L.R.C.P., C. Rutherford, M.B., Elizabeth Casson, M.B. and R. A. MacNab, M.B. Virginia Water station, 5 minutes. Seaside Branch, *St. Ann's*, Canford Cliffs, Bournemouth. Med. Off., C. G. Cowie, M.D. *See also Advt., p. 99*

Wadsley (near Sheffield).—*South Yorkshire Asylum*. Res. Med. Supt., W. J. N. Vincent, C.B.E., M.D. Wadsley Bridge, 1 mile; Sheffield, 4 miles.

Wakefield.—*West Riding Asylum*. Res. Med. Supt., Prof. J. Shaw Bolton, M.D. Kirkgate and Westgate station, 1 mile.

Wallingford (Berks.).—*Berkshire Mental Hospital*. Res. Med. Supt., Dr. Walter Woolfe Read. Cholsey, 1 mile.

Warlingham (Surrey).—*Croydon Mental Hospital*. Res. Med. Supt., E. S. Pasmore, M.D. Upper Warlingham, $3\frac{1}{2}$ miles.

Warrington (Lancs.).—*Lancashire County Mental Hospital*, Winwick. Res. Med. Supt., A. Simpson, C.B.E., M.D. Warrington, $2\frac{1}{2}$ miles.

Waterford.—*Carriglea Mental Hospital*, Dungarvon, Co. Waterford. (For ladies). Conducted by the Order of Bon Sauveur. Vis. Phys., Dr. J. C. Hackett. Dungarvon station, $3\frac{1}{2}$ miles.

District Mental Hospital, Waterford. Res. Med. Supt., Dr. Alexis FitzGerald. G.S. & W.R., North station, 2 miles.

St. Patrick's Private Mental Hospital, Belmont Park, Waterford. (For the treatment and cure of mentally afflicted gentlemen). Conducted by the Brothers of Charity. Vis. Phys., Dr. P. Coghlan. Waterford station, 1 mile.

See also *Advt.*, p. 102

Wells.—Somerset and Bath Mental Hospital, Wells, Som. Res. Med. Supt., Dr. J. E. P. Shera. Wells station, 1½ miles.

Whitchurch (Salop).—St. Mary's House. (For ladies only.) Res. Med. Supt., —. —. Whitchurch, 1 mile.

Whittingham (near Preston).—County Mental Hospital. Res. Med. Supt., Dr. R. M. Clark. Whittingham station, 3 minutes.

Winchelsea (Sussex).—Periteau, near Hastings (for ladies). Physician, Harvey Baird, M.D. Winchelsea station, 1 mile.

Woking (Surrey).—County Mental Hospital, Brookwood. Res. Med. Supt., J. A. Lowry, M.D. Brookwood station, 1½ miles.

Worcester.—County & City Mental Hospital, Powick. Res. Med. Supt., Dr. H. F. Fenton. Worcester station, 4 miles.

York.—Bootham Park Registered Hospital, York. Res. Med. Supt., G. R. Jeffrey, M.D. York station, 1 mile.

See also *Advt.*, p. 102

The Pleasaunce, York (ladies only). Phys. Supt. and Res. Licensee, L. D. H. Baugh, M.B. York, 1½ miles.

The Retreat, York. Res. Med. Supt., H. Yellowlees, O.B.E., M.D., F.R.F.P.S. (Glas.), M.R.C.P. (Edin.), D.P.M. York station, 1½ miles. See also *Advt.*, p. 104

North Riding of Yorkshire Asylum, Clifton, York. Res. Med. Supt., Dr. A. I. Eades. York, 2 miles.

York City Asylum, Fulford, York. Res. Med. Supt., Dr. C. L. Hopkins. Naburn, L. & N.E.R., ½ mile.

MENTAL DEFICIENCY ACT, 1913: CERTIFIED INSTITUTIONS AND HOUSES.

Class A.—Certified Institutions. *Class B.*—Institutions approved under Section 37.

Class C.—Certified Houses. *Class D.*—Approved Homes.

BERKSHIRE.

Cumnor Rise, Oxford.—33 females. High-grade feeble-minded. Managers, Committee. Hon. Secretary, Honble P. Bruce, 4, Wellington Place, St. Giles, Oxford. (*Class A.*)

BUCKINGHAMSHIRE.

Winslow Union Workhouse. Winslow.—7 male, 33 female, adults. Feeble minded and imbecile. Managers, Winslow Board of Guardians. (*Class B.*)

CHESHIRE.

Sandlebridge, near Alderley Edge.—296 males and females. Life care is provided, but only educable mentally defective children under 13 years of age are eligible for admission. Managers, Incorporated Lancashire and Cheshire Society for the Permanent Care of the Feeble Minded. Sec., E. M. Richards, 1, Brazenose Street, Manchester. (*Class A.*)

Ashton House, 26, Village Road, Oxton, Birkenhead. For 40 girls (high grade only). Supt., Miss O. M. Wilkinson. (*Class C.*)

CORNWALL.

The Elizabeth-Barclay Home, Bodmin.—26 females. Matron, Miss E. Hunt; Hon. Sec., Miss M. I. Braddon, Skisdon, Wadebridge. (*Class D.*)

CUMBERLAND.

Durran Hill House, Carlisle.—65 females. Feeble minded. Higher Grade. Sec., T. W. Hunter, Archbishop's House, Westminster, S.W.1. (*Class A.*)

DERBYSHIRE.

Whittington Hall, Whittington, near Chesterfield.—400 females. Managers, The Incorporation of National Institutions for Persons requiring Care and Control, 14, Howick Place, Victoria Street, S.W. 1. (*Class A.*)

DEVON.

Western Counties Institution, Starcross.—450 males and females (trainable children). Sec. Supt., C. W. Mayer. (*Class A.*)

DORSET.

Mount Tabor, Lower Parkstone.—16 females over school age. Supt., Sister Mary Frances. (*Class A.*)

DURHAM.

Monkton Hall Home for Lads, Jarrow-on-Tyne.—51 males. Sec., J. Stewart, 90 Pilgrim Street, Newcastle. (Class A.)

ESSEX.

Bigods Hall, R. C. Special School, near Dunmow.—61 males. Corresponding Manager, Rt. Rev. Mgr. Wm. O'Grady, St. George's, Walthamstow, E. 17. (Class A.)

Elloe House, Church Road, Leyton.—102 high-grade feeble-minded females, over 16. Corresponding Manager, as for *Bigods Hall*. (Class A.)

The Institution, Tendring, Clacton-on-Sea, Essex.—26 males, 26 females. Managers, Guardians of the Tendring Union. Supt., H. J. Burden. (Class A.)

Royal Eastern Counties Institution, Colchester.—1070 males and females, all grades. Managers, The Board of Directors. Address communications to the Medical Superintendent. (Class A.)

The Co-operative Sanatorium, Billericay.—56 males of the middle class. Managers, The Co-operative Sanatoria Ltd. (Class A.)

Gay Bowers, West Hanningfield, Chelmsford.—7 males. Manager, Percy Chennells. (Class D.)

GLOUCESTERSHIRE.

Brentry Certified Institution, Westbury-on-Trym, Bristol.—230 males. Res. Supt., T. R. Lambert; Med. Off., Dr. Ormerod. Clifton Down, Redland, or Patchway stations, 3½ miles. (Class A.)

St. Mary's Home, Painswick, near Stroud.—29 females. High-grade feeble-minded. Apply, Lady Supt. (Class A.)

Stoke Park Colony, Hanham Hall, Hanham, near Bristol.—240 males. Managers, The Incorporation of National Institutions for Persons requiring Care and Control. (Class A.)

Stoke Park Colony, Royal Victoria Home, Horfield.—42 females. Managers, The Incorporation of National Institutions for Persons requiring Care and Control. (Class A.)

Stoke Park Colony, Stapleton, Bristol.—790 patients of both sexes (not exceeding 650 females or 300 males). Managers, The Incorporation of National Institutions for Persons requiring Care and Control. (Class A.) See also *Advt.*, p. 75

Stoke Park Colony, West Side, Stapleton.—308 males. Managers, The Incorporation of National Institutions for Persons requiring Care and Control. (Class A.)

Stapleton Institution, Bristol—40 males, 60 females. Managers, Bristol Board of Guardians. Superintendent, A. F. Waters. (Class B.)

Royal Fort Home, Bristol.—20 females, high-grade mentally deficient. Managers, Ladies' Committee. Hon. Sec., Miss Savill, 40, Tyndall's Park Road. (Class D.)

HAMPSHIRE.

St. Mary's Home, Alton.—45 mentally and morally deficient females. Managers, The Wantage Community of Sisters. (Class A.)

HERTS.

Hillside Special School for Mentally Defective Boys, Buntingford.—43 males. Secretary, T. W. Hunter, Archbishop's House, Westminster, S.W. 1. (Class A.)

St. Elizabeth's Home for Epileptics, Much Hadham.—136 males and females. Apply to T. W. Hunter, Archbishop's House Westminster, S.W. 1. (Class A.)

Rowley Lodge, Rowley Green, Barnet.—Educational home for 13 backward boys and girls. Principals, The Misses Wall and Binney. (Class C and D.)

See also *Advt.*, p. 73

KENT.

Princess Christian's Farm Colony, Hildenborough.—73 males, 68 females. Managers, National Association for the Feeble Minded. Superintendent, Miss Pitman. (Class A and D.)

LANCASHIRE.

Allerton Priory R.C. Special Industrial School, Woolton, Liverpool.—106 male and female educable children. Superintendent, Sister E. Thompson. (Class A.)

Calderstones, Whalley, near Blackburn.—1050 males, 1050 females. Feeble minded, imbeciles, idiots, and moral imbeciles. Managers, Mental Deficiency Acts Committee, Lancashire Asylums Board, Preston. (Class A.)

Pontville R.C. Special School, Ormskirk.—106 boys. Mentally defective. Corresponding Manager, Right Rev. Monsignor Canon Pinnington, 109, Great Mersey Street Liverpool. (Class A.)

Royal Albert Institution, Lancaster.—800 of both sexes. Managers, The Central Committee of the Royal Albert Institution, Lancaster. Secretary, Samuel Kerr. (Class A.) See also *Advt.*, p. 75

Seafeld House, Waterloo Road, Seaford, near Liverpool.—240 feeble minded children. Managers, Guardians of the West Derby Union. Liverpool. (Class B.)

LEICESTERSHIRE.

Leicester Frith, Groby Road, Leicester (with ancillary premises), at *Cross Corners*, 2, *Thurcaston Road, Leicester.*—Feeble minded of both sexes. Supt., Miss N. Russam. (Class A.)

LONDON.

39, Downs Road, 41, Downs Road, 46-48, Pembury Road, Clapton, E. 5.—80 females. Apply: Sec., Miss C. Tozer, 39, Downs Road, Clapton, E. 5. (Class A.)

The Helping Hand Home, 16, Cathcart Hill, N.—30 females. High grade mentally deficient. Managers, Committee; Hon. Sec., Mrs. Geoffrey Russell, 17, Church Row, Hampstead, N.W. 3. (Class A.)

Kensington Guardians' Institution, Marloes Road, W. 8.—60 females. Managers, Guardians of the Poor of the Parish of St. Mary Abbots, Kensington. Supt., Mr. Francis Birch. (Class B.)

Woolwich Workhouse, Plumstead, S.E.—25 males, 45 females sent by L.C.C. only. Managers, Board of Guardians of the Woolwich Union. E. G. Manning, Supt. (Class B.)

MIDDLESEX.

All Souls' Special School, Field Heath House, Hillingdon.—89 females. Educable and imbeciles. Manager, T. W. Hunter, Archbishop's House, Westminster, S.W. 1. (Class A.)

Bramley House, Gordon Hill, Enfield.—45 females. Supt., Miss J. M. Bowler. (Class A.)

Crathorne, Oak Lane, East Finchley, N.—32, consisting of women with their infants. Hon. Sec., Miss Violet Hall, 57, Bryanston Street, W. 1. (Class A.)

Enfield House, 19, Chase Side Crescent, Enfield, Middlesex.—40 males. Managers, Guardians of Edmonton Union. Superintendent, E. B. Willett. (Class A.)

Arniston, 44, The Grove, Isleworth.—10 males under 14, and 10 females. Managers, Misses J. M. and M. D. Isbister. (Class C.)

Normansfield, Hampton Wick.—140 males and females of all ages. Manager, Dr. R. L. Langdon-Down. (Class C.)

See also *Advt.*, p. 73

The Gables, Upper Teddington Road, Hampton Wick.—18 male and female children. Manager, Miss Frances M. Deck. (Class C.)

Alexander House, 117, High Street, Uxbridge.—24 females over 16. Managers, Committee. Supt., Miss E. Collyer. (Class D.)

Conifers, Hampton Wick.—20 females, and 3 male children. Manager, Dr. R. L. Langdon-Down. (Class D.)

Trematon, Hampton Wick.—24 males. Manager, Dr. R. L. Langdon-Down. (Class D.)

NORFOLK.

The Lodge, Bouthorpe Road, Norwich.—6 adult males, 20 adult females. Managers, The Guardians of the Poor of the Norwich Incorporation. (Class B.)

The Oileys, Seething, Norwich.—30 females, children and girls. Superintendent and Proprietress, Miss S. A. Huntly. (Class D.)

NORTHUMBERLAND.

Prudhoe Hall Colony, Prudhoe.—420, all classes. Managers, Northern Counties Joint Poor Law Committee. Supt., Miss N. M. Hawkes. (Class A and B.)

Home of Industry, Bow Villa, Morpeth.—16 females. Feeble minded. Superintendent, Miss A. Pawsey. (Class D.)

SOMERSET.

Stoke Park Colony, Leigh Court, Abbot's Leigh, nr. Bristol.—260 females. Managers, The Incorporation of National Institutions for Persons requiring Care and Control. (Class A.)

Rock Hall House, Combe Down, Bath.—18 males, 19 females. Supt., Miss O. G. Neville. (Class A.)

Long Ashton Poor Law Institution, Flax Bourton, near Bristol.—32 males, 34 females. Managers, Guardians of the Long Ashton Union. (Class B.)

Yatton Hall, Yatton, near Bristol—Both sexes. Supt., Miss J. McGill. (Class A.)

STAFFORDSHIRE.

Burton-on-Trent Poor Law Institution.—3 males, 2 females. Managers, Guardians Burton Union. Master, R. Bareham. (Class A.)

New Cross Poor Law Institution, Mental Wards, Wolverhampton.—2 males. Managers, Wolverhampton Board of Guardians. Supt., T. D. Rollinson. (Class A.)

Poor Law Institution, Dudley, Stafford.—50 males, 60 females. Managers, Guardians of the Dudley Union. (Class B.)

SUFFOLK.

Handford Home, Ranelagh Road, Ipswich.—20 high-grade females. Supt., Mrs. A. Turner, Crane Hall, Ipswich. (Class A.)

St. Joseph's Home, The Croft, Sudbury.—19 females. Supt., Sister Veronica Whelan. (Class A.)

SURREY.

Royal Earlswood Institution, Redhill.—300 males, 300 females. Med. Supt., Dr. S. Langton. Secretary, 14, Ludgate Hill, E.C. 4. (Class A.)

SUSSEX.

Avonhurst, Burgess Hill.—22 private cases only, males and females under 16. Manager, Miss S. M. Macdowall. (Class C.)

WARWICK.

Agatha Stacey Homes, Rednal, near Birmingham.—40 females; and *Ennis-kerry, Knowle, Warwickshire.*—24 females. Managers, The Central Committee, 158, Broad Street, Birmingham. (Class A.)

Midland Counties Institution, Knowle, near Birmingham.—140 males. Managers, The Committee. Superintendent, A. H. Williams. Medical Officer, J. O. Hollick, M.B. (Class A.)

WILTS.

Devizes Poor Law Institution.—16 females between the ages of 20 and 50 years. Managers, Devizes Board of Guardians. (Class B.)

Pewsey Poor Law Institution, Pewsey.—12 females, 12 males. Managers, Pewsey Board of Guardians. Supt., H. England. (Class B.)

Poor Law Institution, Semington, near Trowbridge.—6 males, 30 females. Managers, Guardians Trowbridge and Melksham Union. Supt., C. H. Taylor. (Class B.)

WORCESTERSHIRE.

Besford Court Catholic Mental Welfare Hospital for Children, Besford, near Defford.—For 119 educable mentally defective boys from 8 to 16 years. Res. Manager, The Right Rev. Monsignor T. A. Newsome. (Class A.)

Evesham Poor Law Institution.—Certified only for dealing with cases arising in the Evesham Union Area. Superintendent, J. H. Damen. (Class B.)

YORKSHIRE.

Meanwood Park Colony, Meanwood, Leeds. Both sexes. Supt., Miss Longdown. (Class A.)

Mid-Yorkshire Institution, Whitley, York.—184 males. Managers, The Mid-Yorkshire Joint Board. Supt., Capt. J. Brown, I.S.O. (Class A.)

The Grange, Ailtofts, Normanton.—15 females, good class. Mentally deficient, epileptics. Proprietor, Mrs. E. A. Howard. (Class C.)

INSTITUTIONS AND HOMES FOR INEBRIATES.

LICENSED UNDER THE ACTS, 1879-1900.

The patient must sign a Form expressing a wish to enter the Home, before a magistrate. This can be done at the private residence of the patient, or at the retreat, if previous notice has been given. Two friends must also sign a declaration that they consider the patient an 'Inebriate' within the meaning of the Acts.

* NOTE:—Ashford is a Roman Catholic Religious Institution.

MALES ONLY.

Rickmansworth (Herts).—*Dalrymple House.* Apply to Res. Med. Supt., Dr. F. S. D. Hogg. Rickmansworth station, L. & N.-E.R. & Metropolitan Rlwy, $\frac{1}{2}$ mile; L. & N.W.R., 1 mile. See also *Advt.*, p. 85

FEMALES ONLY.

*Ashford (Middlesex).**—*Ecclesfield.* Med. Supt., Dr. John Reid. Apply, Mother Superior. Ashford station, 1 mile. See also *Advt.*, p. 85

Belfast.—*The Lodge Retreat, Irwin Avenue, Strandtown.* Med. Attendant, R. W. Leslie, M.D. Co. Down line train, 2 minutes' walk.

Beverley (E. Yorks).—*Albion House.* Med. Supt., H. L. Munro, M.D. Hon. Sec., Mrs. T. R. Pentith, The Limes, Sutton-on-Hull. Beverley, 1 mile.

Reigate (Surrey).—*The Lady Henry Somerset Homes, Duxhurst.* Hon. Supt. and Res. Trustee, Miss Case, O.B.E. Reigate, 4 miles; Hurley, 3 miles.

Spelthorne St. Mary (Bedford, Middlesex).—Apply to the Sister Superior C.S.M.V. Med. Supt., Dr. H. W. Newton. Feltham, S.W.R., 1 mile.

Torquay.—*Temple Lodge (C.E.T.S. Institution).* Res. Supt., Sister in Charge. Med. Off., W. Odell, F.R.C.S.

See also *Advt.*, p. 85

UNLICENSED HOMES.

Beckenham (Kent).—*Norwood Sanatorium Ltd.*, The Mansion, Beckenham Park. Med. Supt., F. Hare, M.D. Beckenham Junction, 10 minutes.

See also Advt., p. 84

London.—*Essex House*, Barnes, S.W. Apply, Medical Superintendent.

Springfield House, 92, Tulse Hill, S.W. Apply, Medical Superintendent. Charing Cross, 4 miles.

Paignton (Devon).—*Bay Mount*, small private home for both sexes. Res. Med. Supt., Dr. Stanford Park.

See also Advt., p. 84

Woodbridge (Suffolk).—*Norwood Sanatorium Ltd.*, Rendlesham Hall, Woodbridge. Med. Supt., Walter Asten, M.D. Wickham Market station.

See also Advt., p. 84

SANATORIA FOR CONSUMPTION AND OTHER FORMS OF TUBERCULOSIS.

Aberchalder (N.B.).—*Inverness-shire Sanatorium*. Med. Supt., D. S. Johnston, M.D. Aberchalder, 2 miles.

Arosa (Switzerland).—*The Altein Sanatorium*. Res. House-Phys., Dr. H. Heinz. Man. Director, P. Wieland.

See also Advt., p. 81

Ashford (Kent).—*Grosvenor Sanatorium*, Kennington, near Ashford. Res. Med. Supt., J. A. Milne, M.B., Ch.B. D.P.H.

Aysgarth, S.O. (Yorks).—*Wensleydale Sanatorium*. Physicians, D. Dunbar, M.B., B.S., and W. N. Pickles, M.D., B.S. Aysgarth, $\frac{1}{2}$ mile, via Northallerton, L. & N.E.R. and Hawes Junction, L.M. & S.R.

See also Advt., p. 76

Baguley (Cheshire).—*Baguley Sanatorium*. For Manchester cases. Res. Med. Supt., H. G. Trayer, M.B., D.P.H. Baguley, $1\frac{1}{2}$ miles.

Banchory (Scotland).—*Nordrach-on-Dee*. Senr. Phys., Ian S. Stewart, M.D. Banchory, $1\frac{1}{2}$ miles.

Barrasford (Northumberland).—*The Newcastle-on-Tyne Sanatorium*. Res. Med. Supt., Dr. C. G. R. Goodwin. Barrasford, N.B.R., 4 miles.

Benenden (Kent).—*Sanatorium of "National Association for the Establishment and Maintenance of Sanatoria for Workers suffering from Tuberculosis."* Res. Med. Supt., Dr. H. Spurrier. Bidenden, 3 miles.

Bingley (Yorks.).—*Eldwick Sanatorium* (West Riding County Council school for phthisical children). Med. Off., Dr. Margaret S. Sharp. Bingley station, 2 miles.

Birmingham.—*Municipal Sanatorium*, Yardle Road. Med. Supt., Dr. G. B. Dixon.

Romsley Hill Sanatorium, Halesowen, Worcestershire. 120 beds. Res. Med. Supt., Dr. P. J. Bodington. Hon. Sec., W. S. Aston, 45, Newhall Street, Birmingham. Halesowen, $4\frac{1}{2}$ miles.

See also Advt., p. 76

St. Gerard's Sanatorium, Coleshill, near Birmingham. For Surgical Tuberculosis. Children only. Orthopaedic Surg., Mr. Naughton Dunn. Med. Off., J. B. Wall, M.D.

See also Advt., p. 78

Bolton (Lancs.).—*Wilkinson Sanatorium for Consumptives*, Sharples. Med. Off., Dr. J. D. Marshall.

Boston (Lincs.).—*Holland Sanatorium*. Med. Supt., A. W. Tuxford, M.D.

Bournemouth.—*Royal National Sanatorium for Consumption and Diseases of Chest*. Sec., A. G. A. Major. Res. Med. Off., D. A. Hutcheson, M.D. Bournemouth Central, $1\frac{1}{2}$ miles; Bournemouth West, $\frac{1}{2}$ mile.

The Firs Home (for advanced cases). Hon. Sec., Col. R. F. Anderson. Hon. Med. Offs., C. P. Woodstock, M.D., and S. G. Champion, M.D. Lady Supt., Miss Ingran. Bournemouth Central, $\frac{1}{2}$ mile.

Bovey Tracey (Devon).—*Hawkmoor Sanatorium*. Med. Supt., Dr. J. C. Smyth.

Bradford.—*Bierley Hall Sanatorium*, Bierley Lane. For women and children only. Res. Med. Supt., Dr. L. G. White.

Bridge of Weir (Renfrewshire).—*Consumption Sanatoria of Scotland*. Hon. Treas., Lord MacLay, 21, Bothwell Street, Glasgow. Res. Med. Supt., James Crockett, M.D. Bridge of Weir, 2 miles.

Brighton.—*Municipal Sanatorium*, for Brighton townfolk only (pulmonary and joints). Med. Supt., Dr. Duncan Forbes, M.O.H., Town Hall, Brighton. Brighton, $1\frac{1}{2}$ miles.

Camborne.—*Tehidy Sanatorium*. Med. Supt., Dr. F. Chown.

Chagford (Devon).—*Dartmoor Sanatorium*. Res. Med. Supt., Dr. C. H. Berry. Moretonhampstead G.W.R., 6 miles.

See also Advt., p. 76

Chandler's Ford (Hants.).—*Hants. County Council Sanatorium*. Med. Supt., Dr. W. J. Hart.

Chelmsford (Essex).—*Great Baddow Sanatorium*. Med. Supt., R. G. Lyster, O.B.E., M.B., B.S. Chelmsford, G.E.R., 4 miles.

Cheltenham.—*The Cotswold Sanatorium*, near Stroud, Glos. Res. Med. Supts., A. H. Hoffman, M.D., and Geoffrey A. Hoffman, M.B. Cheltenham, 8 miles.

Salterley Grange Sanatorium, near Cheltenham. Res. Med. Supt., Dr. D. J. Peebles. Leckhampton, $2\frac{1}{2}$ miles; Cheltenham, $3\frac{1}{2}$ miles.

Darlington.—*Felix House*, Middleton St. George, Co. Durham. Res. Med. Supt., C. S. Steavenson, M.B. Dinsdale, N.E.R., 3 minutes.

Davos-Platz (Switzerland).—*The Schatzalp Sanatorium*. Res. Med. Supt., Edward C. Neumann, M.D. *See also Advt., p. 81*

The Sanatorium Turban, Davos-Platz. Med. Directors, Dr. K. Turban and Dr. A. E. Mayer. *See also Advt., p. 80*

Derbyshire.—*Ashover Sanatorium*, near Chesterfield. Res. Med. Supt., Dr. Stuart E. Gordon. Stretton, L.M. & S.R., $3\frac{1}{2}$ miles; Matlock, 4 miles.

Derbyshire Sanatorium, Walton, near Chesterfield. Med. Supt., A. N. Robertson, M.D.

Devon and Cornwall Sanatorium, Didworthy, South Brent. For consumptives of the two counties. Sec., S. Carlile Davis, Esq., M.B.E., 5, Princess Square, Plymouth. Res. Med. Supt., — — — Brent, G.W.R., 2 miles.

Doneraile (Co. Cork).—*Cork Coun and City Sanatorium*, Heatherside. Res. Med. Supt., Dr. R. Ahern. Buttevant, G.S. & W.R., 6 miles.

Dousland (S. Devon).—*Heather Tor Sanatorium*. Med. Off., Sir W. W. Pryn, K.B.E., C.B.

Dublin.—*Peamount Sanatorium*, Hazel-hatch, Dublin. Res. Med. Supt., Dr. G. P. H. Sheehan. Lucan, 2 miles.

Dundee (near).—*Sidlaw Sanatorium*, Auchterhouse. 54 beds for children. (In connection with Dundee Royal Infirmary. Med. Supt., H. J. C. Gibson, M.D.) Vis. Phys., W. E. Foggie, D.S.O., M.D., Vis. Surg., L. T. Price, F.R.C.S.E. Matron, Miss Ellen Norris. Sec., Geo. B. Brough. Auchterhouse station, $1\frac{1}{2}$ miles.

Durham.—*Durham County Consumption Sanatoria*. Sec., Mr. F. Forrest, 54, John Street, Sunderland. For men: Stanhope, Med. Supt. John Gray, O.B.E., M.B. Stanhope station, 1 mile. For women and children: Wolsingham, Med. Supt., Dr. E. G. D. Menzies. Wolsingham station, $\frac{3}{4}$ mile.

East Fortune (East Lothian).—*East Fortune Sanatorium*. Res. Med. Supt., Charles Cameron, M.D. East Fortune, $\frac{1}{2}$ mile.

Edinburgh.—*Royal Victoria Hospital for Consumption*. Under the supervision of Wm. Robertson, M.D., D.P.H., M.O.H., Public Health Department, Public Health Chambers, Johnston Terrace, Edinburgh.

Farnham (Surrey).—*Crooksbury Sanatorium*. Med. Supt., F. R. Walters, M.D. Apply, Secretary.

Fortbreda, Belfast.—*Forster Green Hospital for Consumption and Chest Diseases*. Sec., J. Osborne, 99-103, Scottish Provident Buildings, Belfast. Belfast, 2 miles.

Frimley (Surrey).—*Brompton Hospital Sanatorium*. Res. Med. Supt., Dr. R. C. Wingfield. Frimley station, 2 miles.

See also Advt., p. 56

Grange-over-Sands.—*Westmorland Sanatorium*, Meathop. Res. Med. Supt., C. F. Walker, M.D., D.P.H. Grange-over-Sands station, 2 miles.

Harpenden (Herts).—*Sanatorium of the National Children's Home and Orphanage*. Vis. Phys., T. N. Kelynack, M.D. Principal, Rev. W. Hodson Smith, 104-122, City Road, E.C. 1. *See also Advt., p. 79*

Hastings.—*Fairlight Sanatorium*, in connection with Margaret Street Hospital for Consumption (for Out-Patients), 26, Margaret St., W. Sec., Mrs. M. C. Hawthorne. Med. Off., Dr. N. F. Stallard. Hastings, tram, about 15 minutes.

Heswall (Cheshire).—*Cleaver Sanatorium for Children*. Med. Supt., J. B. Yeoman, M.D. Matron, Miss D. Kelsall. Heswall, $1\frac{1}{2}$ miles.

Hexham (Northumberland).—*Wooley Sanatorium*. Med. Supt., J. B. McDougall, M.D.

Huddersfield.—*Bradley Wood Sanatorium for Pulmonary and Surgical Tuberculosis*, Bradley. Res. Med. Supt., R. C. Poyser, M.R.C.S., L.R.C.P. Bradley, 1 mile.

Hull.—*Hull and East Riding Convalescent Home*, Withernsea. Sec., Benjamin Brooks, Royal Infirmary, Hull. Med. Off., A. E. Sproule, L.R.C.P. Withernsea station.

Huntingdon.—*Wytton Sanatorium* (for women and children). Med. Supt., C. B. Moss-Blundell, M.D.

Ilkley (Yorks.).—*Middleton Sanatorium*, near Ilkley. Res. Med. Supt., T. Campbell, M.D.

Isle of Wight.—*Royal National Hospital for Consumption*, Ventnor. Res. Med. Supt., Dr. R. C. Hutchinson. Sec., Charles W. Cox, 18, Buckingham Street, Strand, W.C. Ventnor, 1 mile.

See also Advt., p. 56

St. Catherine's Home Sanatorium, Ventnor (for early cases of phthisis in children). Apply Sister-in Charge. Med. Off., H. F. Bassano, M.A., M.B. Ventnor, 5 minutes' drive.

Kingussie (Inverness-shire).—*Grampian Sanatorium*. Res. Med. Supt., Dr. Felix Savy. Kingussie, $\frac{1}{2}$ mile.

See also Advt., p. 77

Kirkcaldy.—*Sanatorium for Tuberculosis*. Med. Supt., Dr. G. W. McIntosh. Sec., The Town Clerk. Kirkcaldy, 1 mile.

Lanark.—*City of Glasgow Sanatorium*, Bellefield, Lanark. Res. Med. Supt., Dr. Alex. Young. Lanark, 20 minutes' walk.

Leeds.—*Leeds Sanatorium for Consumptives*, Gateforth, near Selby, and *Leeds Hospital for Consumptives*, Armley. For poor of Leeds. Sec., C. H. Sedgwick, 37, Great George Street, Leeds.

Leysin-Feydey (Switzerland).—*Station Climatérique de Leysin*: Sanatorium Grand Hotel (Dr. Jaquerod), Sanatorium Mont-Blanc (Dr. Piguet), Sanatorium Chamossaire (Dr. Sillig), Sanatorium Belvédère. Leysin-Feydey station, from 1 to 5 minutes.

See also Advt., p. 82

Liverpool.—*Fazakerley Sanatorium*. Res. Med. Supt., C. Rundle, O.B.E., M.D.

Liverpool Sanatorium for Consumptives, Kingswood, Frodsham; and *Delamere Training Colony*, for tuberculous ex-service men, Frodsham. Sec., W. H. Rayner, Liverpool Hospital for Consumption, Mount Pleasant, Liverpool. Res. Phys., Alfred Adams, M.D. Frodsham; L. & N.W.R., $3\frac{1}{2}$ miles.

Park Hill Sanatorium, Liverpool. Med. Supt., H. R. Macintyre, D.S.O., M.C., M.D.

Llanybyther (Carmarthenshire).—*West Wales Sanatorium*. The Welsh National Memorial to King Edward VII. Res. Med. Supt., Dr. Isabella Ferguson. Llanybyther station, 3 miles.

London.—*City of London Hospital for Diseases of the Heart and Lungs*, Victoria Park, E. 2. Apply, Secretary. Cambridge Heath, G.E.R., Bus or Tram, 5 minutes.

Mount Vernon Hospital for Tuberculosis and Diseases of the Lungs and Heart, Northwood. Northwood (Met. & L. & N.E. Rly.), 1 mile. Res. Phys., Dr. W. G. Kinton. Out-patient department, 7, Fitzroy Square, W. Secretary, W. J. Morton.

Royal Chest Hospital, 231, City Road, E.C. 1 (Section of the Royal Northern Group of Hospitals). Apply to the Secretary.

Manchester.—*Hospital for Consumption and Diseases of Throat and Chest*, Bowdon; *Crossley Sanatorium*, Delamere, Cheshire. (For poor and working classes, after personal examination at Manchester.) Sec., Hardman Street, Manchester.

Margate (Kent).—*Royal Sea-bathing Hospital* (for Surgical Tuberculosis). Med. Supt., Dr. Basil Armstrong, M.C. Sec., A. Nash, 13, Charing Cross, S.W. 1. Margate West, $\frac{1}{2}$ mile.

Marple (Cheshire).—*Nab Top Sanatorium*, for residents of Salford only. Res. Med. Supt., H. M. Fleming, M.D.

Market Drayton.—*Cheshire Joint Sanatorium*. Res. Med. Supt., Dr. P. W. Edwards.

Matlock (Derbyshire).—*Matlock Sanatorium*. Med. Supt., Dr. Frederick Kincaid. Matlock, 1 mile.

Menai Bridge, Anglesey.—*Penhysgyn-y-Gors Sanatorium*. Sister-in-charge, Miss Williams.

Mendip Hills.—*Mendip Hills Sanatorium*, Wells, Somerset. Res. Phys., Dr. C. Muthu. Wells station, 3 miles.

See also Advt., p. 80

Nordrach-upon-Mendip, Blagdon, near Bristol. Med. Supts., R. Thurnam, M.D., and Dr. D. Kennedy (Resident). Burring-ton station, 5 miles.

Midhurst (Sussex).—*King Edward VII Sanatorium*. Res. Med. Supt., Dr. H. O. Blanford. Midhurst, 4 miles.

Murtle (Aberdeenshire).—*Tor-na-Dee Sanatorium*. Res. Med. Supt., Dr. J. M. Johnston. Murtle, $\frac{1}{2}$ mile.

See also Advt., p. 78

Nayland (Suffolk).—*East Anglian Sanatorium* for Private Patients, *Malings Farm Sanatorium* for poorer men and women patients, and *East Anglian Children's Sanatorium*, Nayland. Med. Supt., Dr. Jane Walker. Bures Station, L. & N.E.R., $3\frac{1}{2}$ miles, Colchester, 8 miles.

See also Advt., p. 78

New Cumnock (Ayrshire).—*Ayrshire Sanatorium*, Glenafton. Res. Med. Supt., E. E. Prest, M.D. New Cumnock, 3 miles.

Norfolk.—*Children's Sanatorium for the Treatment of Phthisis, Incorporated*, Holt. Vis. Med. Off., Dr. H. F. Skrimshire. Hon. Sec., Mrs. C. Munro, Carnegie House, 117, Piccadilly, W.1.

Kelling Sanatorium, Holt. Res. Med. Supt., Dr. J. I. W. Morris. Holt, 1½ miles.

Mundesley Sanatorium, Mundesley. Res. Med. Supts., S. Vere Pearson, M.D., G. Lucas, M.D., and Dr. L. W. Sharp. Mundesley, 1 mile.

Northampton.—*Northamptonshire Sanatorium*, Creton. Res. Med. Supt., Dr. C. Milne. Brixworth, L. & N.W.R., 3 miles.

Nottingham.—*Ransom Sanatorium*, Sherwood Forest, Mansfield. Res. Med. Off., Dr. R. R. S. Weatherson. Mansfield, 3 miles.

Nuneaton (near).—*Bramcote Sanatorium*, Bramcote. For men only. Res. Med. Supt., Dr. F. R. G. Heaf.

Oban, Scotland.—*Argyll County Sanatorium*. Vis. Med. Off., Duncan MacDonald, M.D. Oban, 1 mile.

Oldham.—*Strinesdale Sanatorium*. Med. Supt., Dr. J. B. Wilkinson. Oldham, 2 miles.

Peebles.—*Manor Valley Sanatorium*. Med. Off., C. B. Gunn, M.D. Peebles, 4 miles, Lyne, 2 miles.

Penmaenmawr (N. Wales).—*Pendyffryn Hall Sanatorium*. Res. Phys., C. H. Brodribb, M.B., B.S. (Lond.), L.R.C.P., and N. Berkley Ash, M.R.C.S., L.R.C.P. Penmaenmawr, L. & N.W.R., 1 mile.
See also Advt., p. 77

Peppard Common (Oxon).—*Berks. and Bucks. Joint Sanatorium*. Res. Chief Med. Off., Dr. Esther Carling. Reading, 6½ miles.

Ringwood (Hants).—*Linford Sanatorium*. Res. Med. Supts., A. de W. Snowden, M.D., Dr. J. D. Macfie, and Dr. S. D. Stevens. Ringwood station, 2½ miles.

Rudgwick (Sussex).—*Rudgwick Sanatorium*. Vis. London Phys., Dr. Annie McCall. Rudgwick station, 5 minutes.

Ruthin (N. Wales).—*Vale of Clwyd Sanatorium*, Llanbedr Hall. Res. Med. Supt., H. Morriston Davies, M.D. Ruthin station, 2 miles.
See also Advt., p. 80

St. Leonards.—*Eversfield Chest Hospital*, West Hill. Res. Phys., Dr. E. J. Maxwell. West St. Leonards, S.E.R., West Marina, L.B. & S.C.R., within 5 minutes' walk.

Sandy (Beds.).—*The Sanatorium*, Mogerhanger Park. Med. Supt., C. G. Welch, M.D.

Sandon, near Chelmsford (Essex).—*Merivale Sanatorium*. Res. Med. Supt. H. N. Marrett, M.R.C.S. Chelmsford station, G.E.R., 3½ miles.

Sheffield.—*The City Sanatoria*. Crimicar Lane Sanatorium (males); Commonside Sanatorium (females); Winter Street Sanatorium (both sexes); Fir Vale Sanatorium (children). Res. Med. Supt., John Rennie, M.D. Sheffield, L.M.S., 4½ miles.

Shirlett, near Broseley (Shropshire).—*King Edward VII Memorial Sanatorium*. Res. Med. Supt., Dr. F. T. Turner. Much Wenlock station, 3 miles.

Skipton (Yorks).—*Eastby Sanatorium for Children*. Res. Med. Supt., Dr. Catherine Arnott. Embsay station, 2 miles.

Stannington (Northumberland).—*"Philipson" Children's Sanatorium*. Res. Med. Off., Dr. Elsie F. Farquharson. Med. Supt., T. C. Hunter, M.D. Matron, Miss M. Campbell. Stannington station, 2 miles.

Stonehouse (Glos.).—*Standish House Sanatorium*. Med. Supt., W. A. Dickson, M.D.

Stourbridge (Wores.).—*Prestwood Sanatorium*. Med. Supt., Dr. J. Stevenson, M.C.

Threlkeld (Cumberland).—*Blencathra Sanatorium*. Res. Med. Supt., Dr. W. Goodchild. Threlkeld, C.K. & P.R., 2 m.

Torquay.—*"Whiterliff" Tuberculosis Hospital*. Med. Staff, Dr. E. Ward and Dr. H. K. Griffith. Sec., H. J. Hibbs. Torre station.

Ware (Herts.).—*Hertfordshire County Sanatorium*. Res. Med. Supt., C. Roper, M.D.

Warrenpoint (Co. Down).—*Rostrevor Sanatorium*. Phys., Dr. J. A. O'Tierney. Apply Secretary.

Whiteabbey, Co. Antrim.—*Belfast Municipal Sanatorium*. Res. Med. Supt., S. H. Stewart, M.D.

Wicklow.—*The Royal National Hospital for Consumption for Ireland*, New-castle, Wicklow. Res. Med. Off., C. Denys Hanan, M.D. D. & S.E.R. to Newcastle, Co. Wicklow, 3 miles.

Winsley, near Bath.—*Winsley Sanatorium*. Senr. Res. Med. Off., Dr. Chas. E. Redman. Limpley Stoke station, 1 mile.

Worcester (near).—*King Edward VII Memorial Sanatorium*, Knightwick. Free to County patients. Res. Med. Supt., Dr. H. Gordon-Smith. Knightwick, G.W.R., 1½ miles.

HYDROPATHIC ESTABLISHMENTS.

Baslow (Derbyshire).—*Grand Hotel and Hydro.* Man., A. C. Mercer. Bakewell, 4 miles; Grindleford, 5 miles.

Ben Rhydding (Yorkshire).—*Ben Rhydding Hydro Hotel.* Res. Phys., G. Cooper, M.D. Station, 5 minutes.

Birmingham.—*The City Hydropathic and Massage Establishment,* 131, Monument Rd., Proprietor, Robert Schenkel (*Swiss*). See also *Advt.*, p. 86

Bournemouth (Hampshire).—*Bournemouth Hydropathic.* Res. Med. Supt., W. J. Smyth, M.D. East station, 1½ miles; West station, ½ mile.

Bristol.—*The Bristol Hydropathic and Electrotherapeutic Establishment,* College Green. Res. Phys., W. J. Spoor, M.B., M.R.C.S. and A. T. Spoor, M.A., M.R.C.S., L.R.C.P. Temple Meads, 1¼ miles.

Buxton.—*Buxton Hydro Hotel.* Manager, G. W. Bosworth. Station, 4 minutes.

Clifton (near Bristol).—*Clifton Grand Spa Hotel and Hydro.* Clifton Down station, 1 mile; Bristol station, 1½ miles. Props., Mr. and Mrs. F. J. Price.

Cork.—*St. Ann's Hill Hydropathic.* Res. Phys., Dr. R. H. Barter. Blarney, 2½; Cork, 8 miles.

Crieff.—*Strathearn Hydro.* (17 miles from Perth). Res. Med. Supt., T. Gordon Meikle, M.B., C.M. Crieff station, 1 mile.

Eastbourne.—*Eastbourne Hydro Hotel.* Eastbourne, L.B. & S.C.R., 1 mile. Man., T. Jefferies.

Forres.—*Cluny Hill Hydropathic.* Vis. Phys., Dr. John Adam. Forres station, 1 mile; Inverness, 24 miles.

Grange-over-Sands.—*Hazlewood Hydro.* Carnforth, L. & N.W.R., then by Furness Railway; Grange-over-Sands, ½ mile.

Harrogate (Yorkshire).—*Harlow Manor Hydro.* Manageress, Miss Oakley. Harrogate, 1 mile.

The Harrogate Hydropathic Lim. Man., W. Taylor, Harrogate station, ½ mile.

Hexham (Northumberland).—*Hexham Hydro Lim.* Hexham, 1 mile; Newcastle, 20 miles.

Ilfracombe.—*The Cliffe Hydro Hotel.* Physicians, H. K. V. Soltan, M.B., B.S. and K. I. Yeo, M.A., M.B. Ilfracombe, 1 mile.

Ilkley (Yorkshire).—*Craiglands Hydro.* Res. Phys., Maurice R. Dobson, O.B.E., M.B., B.S. (Lond.), L.R.C.P., M.R.C.S. (Eng.). See also *Advt.*, p. 90

Limpley Stoke (near Bath).—*West of England Hydropathic.* Apply, the Secretary. Limpley Stoke station.

Malvern.—*The Malvern Hydro Lim.* Phys., Dr. H. Cavendish Fuller. Great Malvern, ½ mile. See also *Advt.*, p. 88

Wyche-side Hydropathic, Malvern. Malvern Wells station, G.W.R., ½ mile; Great Malvern station, 2 miles.

Matlock.—*Rockside Hydropathic,* Matlock. Res. Med. Supt., Dr. Marie Goodwin-Orme, M.B.E. Man. Directors, Miss Goodwin and Mr. John G. Goodwin. Matlock, ½ mile.

Smedley's Hydropathic, Matlock. Res. and Vis. Physicians. Matlock station, ½ mile; omnibus. See also *Advt.*, p. 89

Peebles.—*Peebles Hotel Hydropathic.* Res. Phys., K. R. Collis Hallowes, M.B., B.Ch. L.M.S. and L. & N.E.R. stations about 10 to 15 minutes' walk. See also *Advt.*, p. 87

Southport (Birkdale Park).—*Smedley Hydropathic.* Phys., J. G. G. Corkhill, M.D. Southport or Birkdale stations. See also *Advt.*, p. 86

Kenworthy's Hydropathic Southport. Phys., Dr. A. B. Kenworthy. Chapel Street (L. & Y.); Lord Street (Cheshire Lines).

Tunbridge Wells.—*The Spa Hotel.* Station about 1 mile. Apply, Manageress.

Ulverston.—*Conishead Priory Hydropathic.* Visiting Physician, Dr. Robert Ashburner. Ulverston station, 2 miles.

Watford (Herts.).—*The Stanboroughs Hydropathic Institution.* Res. Physician, Watford Junc., L.N.W.R. See also *Advt.*, p. 86

NURSING INSTITUTIONS AND TRAINING INSTITUTIONS FOR NURSES.

Liverpool.—*Male and Female Nurses' Institution*, Hope House, Hope Street. Principal, Jno. Kynaston.

See also Advt., p. 64

London.—*Cavendish Temperance Male Nurses' Corporation Ltd.*, 43, New Cavendish St., W. 1; 23, Upper Baggot St., Dublin; 28, Windsor Terr., Glasgow; and 176, Oxford Rd., Manchester.

See also Advt., p. 71

Chartered Society of Massage and Medical Gymnastics, 157, Great Portland Street, W. Sec., Miss Templeton. *See also Advt., p. 65*

Co-operation of Temperance Male and Female Nurses, 60, Weymouth Street, W. 1. Sec., M. Sullivan. *See also Advt., p. 1*

Co-operation of Trained Nurses, Male and Female, 3, Dorset Street, Baker Street, W. 1. Apply, Secretary.

See also Advt., p. 1

Male Nurses' Association, 29, York Street, Baker Street, W. 1. Sec., W. J. Hicks.

See also Advt., p. 69

New Mental Nurses' Co-operation, 139, Edgware Road, Marble Arch, W.

See also Advt., p. 71

St. Luke's Hospital. Trained Nurses for Mental and Nervous Cases. Lady Supt., 19, Nottingham Place, W. 1; also at 57, Clarendon Road, Leeds.

See also Advt., p. 65

Swedish Institute and Clinique, 108, Cromwell Road, S.W. 7. For Medical Gymnastics, Massage, and Electricity.

See also Advt., p. 70

The Nurses' Association, 29, York Street, Baker Street, W. 1. Sec., W. J. Hicks; Supt., Mrs. Millicent Hicks.

See also Advt., p. 69

Westminster Hospital School of Massage, Westminster Hospital, 12, Caxton Street, S.W. 1. Apply, The Principal.

See also Advt., p. 70

York.—*The Retreat* (Trained Nurses' Department, for mental and nervous cases only).

See also Advt., p. 104

PRIVATE HOMES FOR INVALIDS, MATERNITY HOMES, INSTITUTIONS FOR SPECIAL CARE AND TREATMENT.

Aberdeen.—*Balgownie House Nursing Home*. Functional nervous disorders. Matron, Miss Weir. *See also Advt., p. 74*

Alderley Edge (Cheshire).—*The David Lewis Colony* (for Sane Epileptics), and *Colthurst House School* (for epileptic boys). Res. Director, Alan McDougall, M.D. Alderley Edge, 3 miles.

See also Advt., p. 75

Bath.—*Lansdown Hospital and Nursing Home*, Bath. Special arrangements for patients suffering from gout, rheumatism, and physical infirmities. Physicians, Dr. Percy Wilde and Dr. Wells-Beville. L.M. & S. or G.W. stations, 1 mile.

See also Advt., p. 68

Cheltenham.—*Collingwood*. A nursery home for children in good social position. Principal, Miss Dutton.

See also Advt., 70

Clevedon (Somerset).—*Mount Pleasant*, Victoria Road. For ladies suffering from nervous affections, etc. Apply Dr. & Mrs. Clarke-Whitfield. *See also Advt., p. xvii*

Colinsburgh, Fife.—*Kenlaw House*. Functional nervous diseases. Res. Phys., Dr. W. H. Bryce and Dr. E. Cleaves. Kilmconquhar station, $4\frac{1}{2}$ miles.

See also Advt., p. 74

Edinburgh.—*Edinburgh Medical Baths*, 31, Grange Road. Light, heat, electricity, massage and exercises. Med. Supt., Dr. A. D. Webster, O.B.E. *See also Advt., p. 70*

Queensberry Lodge, Holyrood. For invalid and aged ladies requiring nursing. Governor, A. Miller. *See also Advt., p. 72*

Hadlow Down, Buxted (Sussex).—*South Beacon* (for gentlemen mentally affected, but not ill enough to be certified). Prop., Philip H. Harner. Buxted, 3 miles; Mayfield, 4 miles; Heathfield, 4 miles.

See also Advt., p. 72

Harrogate.—*Clovelly Nursing Home*, Clarence Drive. Rest cure, convalescent, medical and surgical cases. Lady Supt., Miss M. B. Bewsher. *See also Advt., p. 83*

Haslemere (Surrey).—*Haslemere Nursing Home*, "Courtsfold". Medical and maternity cases, convalescents, rest cures. Apply, Miss Walker. *See also Advt., p. 68*

Hove (Sussex).—16, Brunswick Place. Nervous and mental, drug habit, and convalescent cases. Apply, Dr. E. R. Fothergill. *See also Advt., p. 71*

London.—*Home of Rest for the Aged Sick and Infirm*, The Rest, 299-303, Trinity Road, Wandsworth Common, S.W. 18. Tel.: 3014 Battersea. Wandsworth Common (L.B. & S.C.R.). See also *Advt.*, p. 58

Manna Mead Home for Invalids, The Grove, Blackheath, S.E. 10. Principals, Mrs. Knight and Miss Tapley-Spurr. Telephone: Greenwich 976.

See also *Advt.*, p. 72

Northern Heights Home, Ravenscroft House, Ravenscroft Avenue, Golders Green, N.W. 11. Nervous and chronic cases. See also *Advt.*, p. 71

The Radium Institute, 16, Riding House Street, W. Med. Supt., A. E. Hayward Pinch, F.R.C.S. See also *Advt.*, p. 83

Pinner (Middlesex).—*St. Vincent's Open-air Hospital and School for Crippled Boys*. Eastcote. Tubercular and other joint diseases, infantile paralysis, etc. Eastcote, Metrop. Rly., $1\frac{1}{2}$ miles. See also *Advt.*, p. 78

Sevenoaks.—*The Grey House*. Farm and Garden School for backward, borderline, or nervous girls of gentle birth. Hon. Lady Supt., Mrs. Pearce Clark.

See also *Advt.*, p. 73

St. Leonards-on-Sea.—*St. Paul's House*, *Special Home School*, or 12, Upper Maze Hill. Certified by the Board of Education

for the care and training of delicate and backward children. See also *Advt.*, p. 73

The Brooklands, Upper Maze Hill, St. Leonards-on-Sea. Small, select boarding house for a few feeble-minded or sub-normal ladies (not certifiable). Apply, Secretary. See also *Advt.*, p. 96

Torquay.—*Ockenden Convalescent Home*. Med. Supt., H. R. Griffith, F.R.C.S. Lady Supt., M'ss G'over. Torro and Torquay stations, 1 mile. See also *Advt.*, p. 56

Parkwood, Park Hill Road, Torquay. Medical, nerve, and convalescent home. Principals, Misses Burt-Wilson and Waddell. See also *Advt.*, p. xxxi

Watford (Herts.).—*The Stanboroughs*. Medical and Surgical cases. Res. Physician. Watford June., L.N.W.R. See also *Advt.*, p. 86

Westcliff-on-Sea (Essex).—*Westcliff Nursing Home*, Ponbury Road. Medical, surgical, maternity, etc. Matron, Miss M. A. Clarke. See also *Advt.*, p. 68

Winchester (Hants).—*Menor House*, Headbourne Worthy. Resident Patient (borderline, rest cure, or acouchement). Res. Med. Supt., Dr. L. M. Breton. Apply Mrs. G. A. Breton. King's Worthy, 5 mins.; Winchester, $1\frac{1}{2}$ miles. See also *Advt.*, p. 72

PRINCIPAL BRITISH SPAS,

WITH INDICATIONS FOR THEIR THERAPEUTICAL EMPLOYMENT.

THE BRITISH SPA FEDERATION,

Comprising the Spas of BATH, BUXTON, CHELTENHAM, DROITWICH, HARROGATE, LEAMINGTON, LLANDRINDOD WELLS, STRATHPEFFER, WOODHALL, and NEW ZEALAND.

Bath (Somerset).—Sheltered from N. and N.E. winds by hills from 600 to 800 feet high; 107 miles from London. Climate mild and equable. Bath is at its busiest in the autumn, winter and spring months, but has an all-the-year-round season. A winter spa is of priceless value to any country, especially to such a country as Britain where, during the winter months, rheumatism in all its forms is particularly prevalent. During the summer there are some complaints in which Bath proves most efficacious.

Waters.—The only hot springs in Britain (120° F.) and the richest natural radio-active mineral waters in this country.

Therapeutic indications.—Specially suitable for all rheumatic and gouty conditions, skin diseases of gouty and rheumatic origin, chronic laryngitis and pharyngitis, and mucous colitis and similar conditions. A detailed list of complaints successfully treated will be sent on application.

Baths.—An extensive and thoroughly equipped bathing establishment. The Queen's Baths and the Old Royal Baths, the Royal Baths (opened 1916) and the New Wing (opened 1919) provide the latest and most approved balneo-therapeutic methods.

Bath specializes in the treatments for which its waters are particularly adapted: deep baths (500 gallons of natural hot radio-active water), undercurrent douching, douche massage in many forms, and intestinal lavage (Flombières douches), throat sprays and inhalation of the natural radium emanation. Particulars of the many other treatments given will be sent on request by John Hatton, Director of the Spa.

Hotel.—The Pulteney Hotel (See p. 91).

Nursing and Baths.—Lansdown Hospital and Nursing Home (See p. 68).

(See also p. xxxii).

Buxton (Derbyshire).—1000 to 1200 feet above sea-level. The highest town in the United Kingdom; 160 miles from London; 22 miles from Manchester. Served by the London, Midland and Scottish Railway. Sheltered from east winds. Very bracing air.

Waters.—Simple, highly radio-active, natural temperature 82° F., mainly bicarbonate of calcium and magnesium ingredients. Tasteless, odourless. Chalybeate springs.

Therapeutic indications.—Gout, rheumatism, rheumatoid arthritis, sciatica, and various nervous diseases, neurasthenia, disorders of digestion, and skin diseases, malaria, mucomembranous colitis, arteriosclerosis, phlebitis, diseases of the throat and air-passages; anæmic conditions, and convalescence from prolonged illness.

Baths.—100 different treatments. All Continental treatments available. Establishments including St. Ann's Well (Pump Room), recently modernized at great cost. Open all the year round. All the latest equipment installed.

Medical Profession, etc.—Complimentary facilities granted to practising medical men and professional nurses.

Boarding Establishment.—The Buckingham (*See p. 82*).

(*See also p. xxxii*).

Cheltenham (Gloucestershire).—Protected from N. and N.E. winds by the Cotswold Hills, 184 feet above sea level; 109 miles from London. Climate soft and mild. Average rainfall 26 inches. Sunshine 1490 hours.

Waters.—Of four kinds: the Fieldholme or twin salt saline, containing nearly equal parts of magnesium sulphate and sodium sulphate: sold in bottles by chemists, under the name of "Chelspa" aperient water; the Lansdown or sodium sulphate saline, the chief ingredients of which are sulphate and chloride of sodium, closely resembling Kissingen waters; the Pittville or alkaline saline, the only alkaline natural water in Great Britain, very similar in analysis to Carlsbad or Marienbad waters; and the Chadnor or magnesium and calcium saline, containing a large quantity of sulphate of magnesium and a considerable amount of carbonate and sulphate of calcium.

Therapeutic indications.—The Fieldholme water is most useful in gastric hyperacidity, sthenic dyspepsia, obesity, plethora, chronic constipation, hemorrhoidal conditions, and glycosuria associated with obesity; Lansdown water for anæmic dyspeptics, skin affections and chronic gastric catarrh; Pittville water for congestion of the liver, torpid liver, biliary catarrh, gastroduodenal catarrh and gall-stones, also for mucous colitis, toxæmia, glycosuria, and catarrhal conditions of the intestinal tract; and Chadnor water for renal disorders, lumbago, myalgia, torticollis, and other forms of fibrositis.

Baths.—An excellent set of baths and douche and massage apartments at the Montpellier Baths, close to the Central Spa. All the latest baths and treatment.

(*See also p. xxxiii*).

Droitwich Spa (Worcestershire).—150 feet above sea level, 126 miles from London (Paddington), 19 miles from Birmingham, 6 from Worcester. Rainfall 27 inches. Mean winter temperature 41° F., summer 65° F. The climate is excellent for invalids both in summer and winter. Moderately bracing, but well protected from N. and N.E. winds.

Waters.—The most powerful saline in the world. The brine is pumped from the triassic formation 200 feet below the ground level. Temperature 54° F., and is heated by introducing steam. It is 10 to 12 times as strong as that of the ocean (Channel), containing in every gallon 20,000 grains of saline in excess of other European waters: the waters are radio-active and radio-emanative.

Therapeutic indications.—Chronic muscular and articular rheumatism, rheumatoid arthritis, chronic articular or irregular gout, neuritis, sciatica, neuralgia, heart diseases, especially those of myocardium—effect similar and equal to Nauheim treatment, or the Nauheim treatment, on the most approved principles, is given if prescribed—neurasthenia, anæmia, chlorosis, some sclerotic diseases of spinal cord, dry, scaly skin diseases, e.g., chronic eczema and psoriasis. Moist eczema is contra-indicated.

Baths.—Reclining, douche, needle, vapour, swimming, Aix-douche, Nauheim baths, brine-pine or Homburg baths, etc.

Hotel.—Worcestershire Brine Baths Hotel. (*See p. 90*).

(*See also p. xxxin*).

Harrogate (Yorkshire).—450–600 feet above sea level, 203 miles from London. Unequalled by any Continental spa, especially for the treatment of gout and its complications. The climate is stimulating and fairly dry—bracing moorland air. Average rainfall 29 inches. Mean temperature 46° F.

Waters.—Celebrated for the medicinal properties of its 87 springs—sulphurous, chalybeate, alkaline, and saline. 'Aqua-peria' aperient mineral water is bottled from a Spring at Harrogate by Camwal Ltd. (*See p. 159*).

Baths.—There are five establishments, where nearly 190 treatments are given, including all the Continental systems and others. The staff of 200 are all medically trained, and the masseurs, etc., fully certificated. The waters are continually under scientific control by the highly qualified scientific officer on the permanent staff. Harrogate also possesses its own pathologist and bacteriologist, x-ray expert, etc.

The surrounding country is unsurpassed for beauty and interest, and the amusements and recreations are of the highest order.

Nursing.—Clovelly Nursing Home. (See p. 83.)

(See also p. xxxiv).

Leamington Spa (Warwickshire).—195 feet above sea level; 88 miles from London. Equable and mild climate. Average rainfall 24 inches. Mean annual temperature 49°50. Westerly winds prevail.

Waters.—Radio-active saline springs, resembling those of Homburg, but more generally useful.

Therapeutic indications.—Muscular and articular rheumatism, gout, rheumatoid arthritis, neuralgia and neuritis, diseases arising from a plethoric condition of the chylipoietic viscera, eczema and other irritative disorders of the skin, conditions of increased vascular tension, and chronic interstitial nephritis.

Baths.—Turkish, saline, 'whirlpool,' swimming, and electric of all kinds.

(See also p. xxxiv).

Llandrindod Wells (Radnorshire).—Situated amidst beautiful mountain and river scenery in Mid-Wales at an altitude of 750 feet above sea-level. Climate exceedingly bracing, but sheltered from east winds, and with an average rainfall of about 35 inches. About 204 miles distant from London, on the main L.M. & S. Railway about mid-way between Shrewsbury and Swansea.

Waters.—Celebrated for the variety and efficacy of its numerous medicinal springs. Saline, sulphur and radium-sulphur, magnesium, lithia saline and chalybeate. Slightly aperient and strongly diuretic.

Therapeutic indications.—Digestive disorders, gout and rheumatism, rheumatoid arthritis, neuritis and fibrositis, gall-stones and biliary stasis, renal calculus or any kidney or bladder condition requiring diuresis, and in neurasthenia or debility from overwork.

Baths.—Sulphur, immersion, needle and douche; Aix and Vichy douche and massage; Scotch douche; Nauheim; medicated baths; fango and peat baths; whirlpool and agitation baths; almost every known form of electrical treatment by fully qualified staff.

Hotels.—The Park Hotel (See p. 91); Ye Wells Hotel (See p. 88).

(See also p. xxxv).

Strathpeffer Spa (Ross-shire. N.B.).—180 to 300 feet above sea level. Sheltered practically on all sides, except the N.E. Prevailing wind S.W. Bracing air. Average rainfall 31 inches. Mean annual temperature 45° F.

Waters.—Sulphurous and chalybeate. Sulphates the predominating salt. Have strong diuretic and mild aperient action.

Therapeutic indications.—Chronic gout and rheumatism, rheumatoid arthritis, chronic skin diseases, chronic disorders of the digestive system, chronic gastric or intestinal catarrh, sluggish portal circulation, congested liver, biliary and urinary calculi, and neurasthenia.

Baths.—Sulphurous (immersion), inhalation, peat, douche (Aix and Vichy), needle, pine, Russian, Nauheim, Plombières, radiant heat (electric), and high-frequency current.

(See also p. xxxv).

Woodhall Spa (Lincolnshire).—50 feet above sea level. 124 miles from London. Average rainfall, 22½ inches. The air, bracing and uncontaminated, sweeping across the Lincolnshire wolds from the sea, is soothing and curative, bringing restful sleep to jaded nerves. The quiet simplicity of Woodhall Spa is in itself a distinction.

Waters.—Bromo-iodine waters, rich in the chlorides of sodium, calcium, and magnesium, with bromine and iodine.

Therapeutic indications.—Rheumatism (chronic articular and muscular), lumbago, arthritis deformans, gouty arthritis, sciatica, neuritis, paralysis, neurasthenia; injuries to joints; skin diseases, psoriasis, urticaria; diseases peculiar to women; diseases of throat and nose; liver disorders. Not only is Woodhall Spa the place to visit in cases of rheumatism, gout, or any of the diseases mentioned; but those who are suffering from overwork and nerve-strain will find it a delightful holiday resort.

Spa Baths.—Recently enlarged. Immersion, shower, undercurrent and local douches Aix and Vichy douche massage; Nauheim, electric and Schnee baths; Dowsing radiant

heat and light baths; Bergoné treatment; nose, throat, and eye mineral sprays and douches; Russian and Berthollet vapour; electric, ionic, and x ray treatments; paraffin-wax treatment; massage and Swedish exercises. There are 60 acres of grounds surrounding the Pump Room. Particulars, apply Secretary.

(See also p. xxxvi).

New Zealand Spas.—The mineral waters of New Zealand are famed both for their great variety and for their powerful therapeutic properties. Many of them are almost unique: quite unlike any European waters; others are of kinds familiar in Europe, but stronger in mineralization than the most famous Continental waters. The principal spas are:—

ROTORUA.—A first-class, well-equipped spa, with complete modern bathing establishment and limitless supply of *Sulphur waters* of two main types: alkaline sulphur containing sodium chloride, bicarbonate, and silicate: and acid sulphur, containing sulphuric acid, and used for baths only. There are mud baths supplied from the *boiling mud springs*, corresponding to the fango treatment of Italy, and natural vapour baths. The massage and electrical department is thoroughly up to date. The whole establishment is under Government management, and skilled medical attendance is provided. As Rotorua is the centre of the thermal district, numerous minor spas are within easy reach, providing primitive but most excellent baths.

Climate and Season.—The latitude corresponds to that of the south of Spain, but the spa being 1000 ft. up, the climate is by no means hot. Season from October to May, but baths open all the year round.

Accommodation.—Several hotels and numerous boarding houses.

Access by train from Auckland or Wellington.

TE AROHA.—Hot *alkaline waters* of the Vichy type, but double the strength. There are comfortable baths, but this is essentially a place for drinking the waters, which are unique in their strength of sodium bicarbonate.

Climate.—Mild and sedative.

Accommodation.—Several hotels and boarding houses.

Access by train, branch from Rotorua line.

HANMER.—In the South Island: has mild sulphur baths and a bracing climate.

There are numerous smaller resorts only partly developed, with valuable *iodine, saline, chalybeate, carbonic acid*, and other waters, and a choice of climate from mild subtropical to bracing Alpine.

(See also p. xxxvi).

OTHER BRITISH SPAS.

Bridge of Allan (Stirlingshire).—422 miles from London. Sheltered from N. and N.E. winds by the Ochil Hills. Average rainfall 33 inches. Climate mild and equable.

Waters.—Natural saline mineral springs (Airthrey).

Therapeutic indications.—Chronic affections of the liver, stomach, and bowels, in many chest diseases, rheumatism, gout, sciatica, and in some diseases of the skin.

Baths.—Excellent suite of baths.

Church Stretton (Salop).—613 feet above sea level. 153 miles from London. Pure bracing air, and a generally invigorating climate. Prevailing wind, S.W. Average rainfall 33 inches. Mean temperature 44°.

Waters.—Said to be the purest in Great Britain.

Therapeutic indications.—Specially the 'open-air' cure of neurasthenia, for sequelæ of influenza, for insomnia, functional nervous diseases, chronic gout and rheumatism, chronic gastric and bronchial catarrh, debility from over-work, and convalescence after illness or operation.

Ilkley (Yorkshire).—Situated on the southern slope of the valley of the Wharfe. 203 miles from London. 18 miles from Harrogate. Occupying a sheltered position. Average rainfall 32 inches. Mean annual temperature, 48° F. Bracing and invigorating moorland air.

Waters.—The water supply obtained from springs is remarkably pure, bright and sparkling. Chalybeate waters. Saline.

Therapeutic indications.—Gout, rheumatism, neuritis, neurasthenia, anæmia, asthma, and bronchitis cases are benefited. The treatment adopted is that known as hydro-therapeutic.

Baths.—Complete suites of baths are to be found in the numerous establishments. Electrical, Weir-Mitchell.

Hydropathic Establishment.—Craiglands Hydropathic. (See p. 90).

Llangammarch Wells (Breconshire).—600 feet above sea level. 213 miles from London. Well protected from the east, and prevailing wind is S.W.

Water.—Saline, containing the chlorides of barium (6½ grains per gallon), calcium, magnesium, lithium, and sodium; the only one of its kind in the British Isles.

Therapeutic indications.—Cardiac diseases, organic and inorganic, especially affections of the myocardium due to influenza. Graves' disease, chronic muscular and articular rheumatism, osteo-arthritis, gout, sciatica, and neurasthenia.

Hotel.—Lake Hotel. (*See p. 82.*) (*See also p. 82.*)

Malvern (Worcestershire).—520 feet above sea level. 122 miles from London. Air dry and bracing. Prevailing winds S.W. and W. Average rainfall 27 inches. Mean temperature about 49° F. Sunshine 1700 hours.

Waters.—Mainly spring, of remarkable purity, free from organic matter, less than 4 grains of earthy salts per gallon. 'Malvernian' Alkaline Table Water bottled by W. & J. Burrow Ltd. (*See p. 153.*)

Therapeutic indications.—Gout, rheumatism, rheumatoid arthritis, neuralgia, sciatica, lumbago, dyspepsia, constipation, anæmia, bronchial, nephritic, and cutaneous diseases.

Baths.—Natural pure brine (from Droitwich), Turkish and electric baths. Vichy massage and Aix douches, fango-di-Battaglia.

Hydropathic Establishment.—The Malvern Hydropathic. (*See p. 83.*)

Matlock Bath (Derbyshire).—300 to 800 feet above sea level, 143 miles from London. Average rainfall 36 inches. Mean temperature about 47° F. Very sheltered.

Waters.—Thermal springs.] Mild sulphated alkaline—saline waters at 68° F., containing 33 grains per gallon of salts, mainly magnesium and calcium bicarbonate, and magnesium sulphate.

Therapeutic indications.—Rheumatism, gout, rheumatoid arthritis, neuritis, neurasthenia, catarrhs (bronchial, gastric, or enteric), anæmia, cardiac asthenia, chronic diseases of the liver or kidneys, digestive and biliary disorders.

Baths.—A complete modern installation exists for the administration of all kinds of baths, douches, packs, and other hydropathic treatment, electricity, massage, inhalations, Nauheim baths, with Swedish exercises.

Matlock Bank (*Matlock station, one mile by rail from Matlock Bath.*)—South-westerly aspect, and well sheltered from the north. 144 miles from London. Climate mildly bracing. Sunshine above the average. The Matlock system of hydropathic treatment is carried out in all its branches, and the principal hydros are installed with latest electric baths and appliances, including high-frequency, Dowsing radiant heat and light, Schnee four-cell, α rays, etc. They also include Turkish, Russian, plunge, medicated, and inhalation baths, Aix and Vichy douches.

Hydropathic Establishment.—Smedley's Hydropathic (*See p. 83.*)

Peebles (Peebleshire, N.B.).—About 500–600 ft. above sea level. One hour from Edinburgh and 382 miles from London. Rainfall, 27 inches. Bracing climate, but sheltered from the north winds.

Waters.—The chief ingredient is chloride of sodium. They are obtained from the famous St. Ronan's Well (6 miles east).

Therapeutic indications.—The waters are specially suited to the Nauheim and Bourbon Lancy treatment of cardiac disease, dyspepsia, gout, rheumatism, and neurasthenia.

Baths.—The baths at the hydropathic are of the most modern type. Complete electrical installation and mud baths (Fango-di-Battaglia).

Hydropathic Establishment.—Peebles Hotel Hydropathic (*See p. 87.*)

Ripon (Yorkshire).—120 feet above sea level. 212 miles from London. Climate mild but bracing. Prevailing winds, W. and S.W.

Waters.—Saline sulphur water from Aldfield Spa, 4 miles distant.

Therapeutic indications.—Chronic and subacute gout, rheumatism, rheumatoid arthritis, chronic skin diseases (eczema, psoriasis, acne), catarrhs, gastric and liver derangements.

The Baths are entirely equipped with up-to-date electric apparatus.

Trefriw Wells (Carnarvonshire).—5 hours from London. The climate is bracing, the air soft, pure, and mostly of a westerly or south-westerly type.

Waters.—Two varieties: (1) The aluminous chalybeate, and (2) the sulpho-magnesian chalybeate. Used internally, and externally in the form of baths.

Therapeutic indications.—Curable forms of anæmia, nervous, debilitating and wasting diseases, rheumatism, sciatica, gout, and neuritis.

Tunbridge Wells (Kent).—400 feet above sea level, 34 miles from London. Climate is tonic and invigorating. Prevailing winds W. and S.W.

Water.—A weak non-aerated, chalybeate spring, containing 4 grains ferrous carbonate to the gallon, with sulphates and chlorides of potash, soda, and calcium.

Therapeutic indications.—Waters indicated in anæmia, chlorosis, and allied conditions.

Baths.—Immersion, douche, needle, Turkish, Russian, vapour, swimming, medicated, and electric light.

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Scottish Board of Health.—121A, Princes Street, and 125, George Street, Edinburgh. *President*, Rt. Hon. the Viscount Novar, G.C.M.G., Secretary for Scotland; *Vice-President*, Capt. W. E. Elliot, M.C., M.P., Parliamentary Under-Secretary for Health; *Chairman*, Ewan Macpherson, C.B., B.A.; *Members*, Sir Leslie Mackenzie, M.A., LL.D., M.D., Sir James Leishman, Miss Muriel Ritson; *Secretary*, John Jeffrey; *Medical Officers*, Lewis D. Cruickshank, M.D., G. Matheson Cullen, M.D., Thos. F. Dewar, C.B., M.D., D.Sc., Fred. Dittmar, M.A., M.D., G. R. Leighton, O.B.E., M.D., A. Shearer, M.B., C.M., Ernest Watt, M.D., D.Sc.; *Lady Medical Officer*, Mary J. Monzies, M.B., Ch.B.

Irish Free State, Ministry of Local Government.—Upper Merrion Street, Dublin. *Minister*, E. Blythe; *Secretary*, E. P. McCarron; *Medical Staff*, E. F. Stephenson, F.R.C.S.I., B. MacCarthy, M.D., R. P. McDonnell, F.R.C.S.I., A. D. Clinch, M.D., W. S. Berry, M.B., Florence Dillon, L.R.C.P.I., J. D. MacCormack, L.R.C.P.I., J. B. Barrett, M.B., W. Dwyor, M.B.

Medical Research Council.—15, York Buildings, Adelphi, London, W.C.2. *Secretary*, Sir Walter M. Fletcher, K.B.E., M.D., Sc.D., F.R.S.

Lunacy Boards.—

ENGLAND & WALES—Board of Control, 66, Victoria St., S.W.1. *Sec.*, O. E. Dickinson, Esq. SCOTLAND—25, Palmerston Place, Edinburgh. *Sec.*, A. D. Wood, Esq., J.P.

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EDUCATIONAL VACCINATION STATIONS.

In order to provide for the granting of those Special Certificates of Proficiency in Vaccination which are required to be part of the Medical Qualification for entering into contracts for the performance of Public Vaccination, or for acting as deputy to a Contractor, the following arrangements are made:—

(1) The Vaccination Stations enumerated in the subjoined list are open, under certain specified conditions, for the purposes of Teaching and Examination;

(2) The Vaccinators officiating at these Stations are authorized to give the required Certificates of Proficiency in Vaccination to persons whom they have sufficiently instructed therein;

(3) The Vaccinators whose names are printed in italic letters are also authorized to give such Certificates, after satisfactory examination, to persons whom they have not themselves instructed.

Cities and Towns having Educational Vaccination Stations.	Places used as Educational Vaccination Stations.	Vaccinators authorized to give Certificates of Proficiency in Vaccination.	Days and Hours of Attendance of the Vaccinators at Stations where periodic Courses of Instruction are given (a).
London	Westminster Hospital	A. E. Cope, M.D.,	Thursday; 10.30
	St. Thomas's Hospital	66, Belgrave Rd., S.W.1	Tuesday; 10.30
	153, Drummond St., N.W.	<i>J. Loane, M.R.C.P.</i>	Wed.; 2
	3, Great Alie Street, E. 1	13, Great Alie Street, E. 1	Wed.; 10.30
	Christ Church Mission Hall, Shroton St., Marylebone	E. C. Greenwood, L.R.C.P., 1, Hanover Hse, St. John's Wood, N.W.8	Fri.; 3 (beginning in Feb. May & Nov.)
London	St. John's Vestry Hall, 9, Fali St., S.E.1.	V. A. Jaynes, M.R.C.S., 157, Jamaica Road, Bermondsey, S.E.16	Wednesday; 2 (except August)
	Royal Free Hospital, Gray's Inn Road, W.C.1	Mrs G. Dearuley, M.D., 27, Seymour House, Compton St., W.C.1	Thursday; 10.15
Birmingham	144, Hockley Hill	W. H. Line, M.D., 144, Hockley Hill	*
Bristol	General Hospital	C. Clarke, M.D., 3, The Fos-away, Clifton	Wednesday; 11 (Nov. & May)
Cambridge	Addenbrooke's Hospital	Dr. F. Deighton, Hills Road	*
Leeds	Leeds General Infirmary	Dr. F. W. M. Greaves, Roundhay Rd.	Thurs. 3 (Oct., Feb., Mar., May, June)
Liverpool	The School of Hygiene	W. Hanna, M.D., Public Health Dept.	*
Manchester	St. Mary's Hosp., Whitworth Street West	Dr. A. M. Mitchell, 8, Egerton Rd., Fallowfield	*
Newcastle-upon-Tyne	The Dispensary, Nelson St.	<i>F. Hawthorn, D.S.O., M.D.</i> 10, Ellison Place	*
Sheffield	Jessop Hospital for Women	John Chisholm, F.R.C.S. 392, Glossop Road.	*
Cardiff	University College	E. Emrys-Roberts, M.D., University College	*
Aberdeen	The Public Dispensary	Dr. John Brown, Hamilton Lodge Aberdeen	Wednesday; 3. (during med. sess.)
Dundee	Royal Infirmary	Dr. D. H. Scott, 10, Aberlemno Ter., Dundee	*
Edinburgh	Marshall Street Dispensary	W. D. D. Small, M.D., 4, Torphichen Street	Sat. 12
	The Royal Public Dispensary	Dr. R. Aitken, 7, Buccleuch Place	Wed. & Sat. 12 (during med. sess.)
	Livingston Memorial Disp. New Town Dispensary	Dr. J. Young, 2, Mayfield Gardens	Wednesday; 3
	Western Dispensary	.. .. .	Thursday; 3
Glasgow	The Royal Infirmary	Dr. H. H. Borland, 41, Circus Drive, Dennistoun	Monday; 12 (Men) Thurs.; 12 (Women) (during med. sess.)
	The Western Infirmary	J. L. Carstairs, M.A., M.B. 6, Sardinia Terrace	Mon. & Thurs.; 12
Belfast	City of Belfast Union Infirm.	Dr. J. McLiesh, 91, Great Victoria Street	Wednesday; 11
Cork	Cork District Hospital	W. E. A. Cummins, M.D., 17, St. Patrick's Place	*
Dublin	45, Upper Sackville Street	<i>Dr. A. N. Montgomery,</i> 45, Upper Sackville Street	Tues., Fri.; (beginning in Jan., April and Oct.)
Galway	The Dispensary	Dr. M. J. McDonough, Flood Street	*

(a.) Candidates for Certificates should communicate with the authorized Teacher to learn the dates of his or her regular courses of instruction. * Days and hours arranged each Session

MEDICAL AND SCIENTIFIC SOCIETIES.

- Abernethian Society—St. Bartholomew's Hospital, E.C.1.
 Æsculapian Society—Metropolitan Hospital, Kingsland Road, E.8.
 Anatomical Society of Great Britain and Ireland—Secretary, John Cameron, M.D., Medical School, Middlesex Hospital, W.1.
 Association of British Postal Medical Officers—Sec., 206, Mansfield Road, Nottingham.
 Association of Physicians of Great Britain and Ireland—Secretary, H. M. Fletcher, M.D., 98, Harley Street, W.1.
 Association of Public Vaccinators of England and Wales—22, Panmuir Road, S.W.20.
 Association of Scottish Medical Diplomates—Hon. Sec., 11, Chandos Street, W.1.
 Association of Surgeons of Great Britain and Ireland—Sec., C. H. S. Frankau, O.B.E., D.S.O., 57A, Wimpole Street, W.1.
 Assurance Medical Society—Sec., F. G. Chandler, M.D., 86, Harley Street, W.1.
 British Association for the Advancement of Radiology and Physiotherapy—Hon. Secretaries, 12, Stratford Place, W.1.
 British Association for the Advancement of Science—Burlington House, W.1.
 British Dental Association—Secretary, 23, Russell Square, W.C.1.
 British Homœopathic Association (Incorporated)—43, Russell Square, W.C.1.
 British Medical Association—Secretary, 429, Strand, W.C.2.
 British Orthopædic Association—Hon. Sec., R. C. Elmslie, O.B.E., M.S., 1A, Portland Place, W.1.
 British Oto-Laryngological Society—Sec., 11, Chandos Street, W.1.
 British Society of Dental Surgeons—Sec., 11, Chandos Street, W.1.
 British Society for the Study of Orthodontics—Sec., 15, Upper Wimpole Street, W.1.
 Chelsea Clinical Society—Sec., 66, Harley Street, W.1.
 Clinical Research Association, Lim.—Watergate House, Adelphi, W.C.2.
 Cremation Society of England—52, New Cavendish Street, W.1.
 Dentists' Provident Society—Sec., 23, Russell Square, W.C.1.
 Epsom College (Royal Medical Foundation)—Sec., 49, Bedford Square, W.C.1.
 Harveian Society of London—Sec., 40, Cleveland Square, W.2.
 Hospital Saturday Fund—Sec., 54, Gray's Inn Road, W.C.1.
 Hunterian Society—Sec., 24, Upper Berkeley Street, W.1.
 Imperial Cancer Research Fund—Examination Hall, 8-11, Queen Square, W.C.1.
 Infirmary Medical Superintendents' Society—Sec., Camberwell Infirmary, S.E.5.
 Institute of Hygiene—Sec., 33 and 34, Devonshire Street, W.1.
 Irish Medical Schools and Graduates' Association—Sec., 11, Chandos Street, W.1.
 Listerian Society—King's College Hospital, S.E.5.
 London and Counties Medical Protection Society, Lim.—Secs., Hugh Woods, M.D., and A. G. R. Foulerton, O.B.E., F.R.C.S., Victory House, Leicester Square, W.C.2.
 London Association of Medical Women—Sec., Mrs. Addison, 125, Harley Street, W.1.
 London Dermatological Society—49, Leicester Square, W.C.2.
 London Hospital Medical Society—Mile End, E.1.
 Medical Abstiners' Association—Hon. Sec., Dr. C. C. Weeks, 55, Paternoster House, E.C.4.
 Medical Defence Union, Lim.—Sec., Dr. James Neal, 49, Bedford Square, W.C.1.
 Medical Officers of Schools' Association—Sec., 11, Chandos Street, W.1.
 Medical Practitioners' Union—Sec., 14, Gray's Inn Square, W.C.1.
 Medical Sickness, Annuity and Life Assurance Society Lim.—300, High Holborn, W.C.1.
 Medical Society for the Study of Venereal Diseases—Sec., 43, Queen Anne Street, W.1.
 Medical Society of London—11, Chandos Street, W.1.
 Medical Women's Federation—Sec., Miss M. Rew, 9, Clifford Street, W.1.
 Medico-Legal Society—11, Chandos Street, W.1.
 Medico-Psychological Association—Sec., 11, Chandos Street, W.1.
 Metropolitan Police Surgeons' Association—Hon. Sec., 2, Spital Square, E.1.
 Middlesex Hospital Medical Society—Hon. Sec., Mortimer Street, W.1.
 National Association for the Prevention of Tuberculosis—20, Hanover Square, W.1.
 National Council for Combating Venereal Diseases—102, Dean Street, W.1.
 National Medical Union—11, Chandos Street, W.1.
 Ophthalmological Society of the United Kingdom—1, Wimpole Street, W.1.
 Pathological Society of Great Britain and Ireland—Sec., University of Cambridge.
 Pharmaceutical Society of Great Britain—17, Bloomsbury Square, W.C.1.
 Physiological Society—Sec., St. Thomas's Hospital, S.E.1.
 Poor Law Medical Officers' Association of England and Wales—2, Finsbury Sq., E.C.2.
 Psycho-Neurological Society—Sec., 19, Cavendish Square, W.1.
 Research Defence Society—11, Chandos Street, W.1.
 Röntgen Society—Hon. Sec., Dr. R. J. Reynolds, 140, Harley Street, W.1.
 Royal Institute of Public Health—37, Russell Square, W.C.1.

- Royal Medical Benevolent Fund—11, Chandos Street, W.1.
 Royal Sanitary Institute, and Parkes Museum—90, Buckingham Palace Road, S.W.1.
 Royal Society of London—Burlington House, Piccadilly, W.1.
 Royal Society of Medicine—1, Wimpole Street, W.1., incorporated by Royal Charter, 1834, and Supplemental Charter, 1907, and embracing the following Sections:—
 Anaesthetical—Balneological and Climatological—Children's Diseases—Clinical—
 Comparative Medicine—Dermatological—Electro-Therapeutical—Epidemiological
 and State Medicine—Historical—Laryngological—Medical—Neurological—Obstet-
 rical and Gynaecological—Odontological—Ophthalmological—Orthopaedical—
 Otological—Pathological—Psychiatry—Surgical (with sub-section of Proctology)
 —Therapeutical and Pharmacological—Tropical Diseases and Parasitology—
 Urological—War Section.
 Royal Society of Tropical Medicine and Hygiene—11, Chandos Street, W.1.
 St. Thomas's Hospital Medical and Physical Society—St. Thomas's Hospital, S.E.1.
 School Dentists' Society—Sec., 82, St. Mark's Road, Bush Hill Park, Enfield.
 Society for the Prevention of Venereal Disease—Hon. Sec., 143, Harley Street, W.1.
 Society for the Relief of Widows and Orphans of Medical Men—11, Chandos Street, W.1.
 Society for the Study of Inebriety—Hon. Sec., 19, Park Crescent, Portland Place, W.1.
 Society of Medical Officers of Health—1, Upper Montague Street, W.C.1.
 Society of Members of the Royal College of Surgeons of England—Sec., S. C. Lawrence,
 M.B., M.R.C.S., 106, Richmond Park Road, Bournemouth.
 State Medical Service Association—Sec., 24, Upper Wimpole Street, W.1.
 Territorial Force Medical Officers' Association—37, Russell Square, W.C.1.
 Tuberculosis Society—Sec., 138, Herbert Road, Woolwich, S.E.18.
 United Kingdom Police Surgeons' Association—Hon. Sec., 20, Hagley Road, Edgbaston.
 Wellcome Historical Medical Museum—54a, Wigmore Street, W.1.
 West Kent Medico-Chirurgical Society—Hon. Sec., Dr. C. J. B. Buchan, 326, Brownhill
 Road, Catford, S.E.6.
 West London Medico-Chirurgical Society—West London Hospital, W.6.

MEDICAL AND SCIENTIFIC PERIODICALS, Etc.

- Anaesthesia, British Journal of—Quarterly, 40/- per annum—Sherratt & Hughes,
 Manchester.
 Analyst—Monthly 3/-; 30/- per annum—W. Heffer & Sons, Cambridge.
 Anatomy, Journal of—Quarterly, 40/- per annum—Cambridge University Press, Fetter
 Lane, E.C.4.
 Annals of Medical History—Quarterly, 42/- per annum—8, Henrietta Street, W.C.2.
 Annals of Surgery—Monthly 4/-—Cassell & Co. Lim., La Belle Sauvage, E.C.4.
 Brain—Quarterly 6/-; 24/- per annum—Macmillan, St. Martin's Street, W.C.2.
 Bristol Medico-Chirurgical Journal—Quarterly 3/-; 10/6 per annum—J. W. Arrow-
 smith Ltd., Bristol. (*See Advertisement.*)
 British Food Journal and Hygienic Review—Monthly 9d.; 10/6 per annum—22,
 Northumberland Avenue, W.C.2.
 British Journal of Experimental Pathology—Six times per annum for 40/—Lewis,
 136, Gower Street, W.C.1.
 British Medical Journal—Weekly 1/3 —429, Strand, W.C.2.
 Burdett's Hospitals and Charities—Yearly 17/6—28-29, Southampton Street, W.C.2.
 Caledonian Medical Journal—Quarterly 1/6—70, Mitchell Street, Glasgow.
 Cancer, Journal of—Quarterly 2/6; 10/6 per annum—Cancer Research Fund (Ireland),
 Hume House, Dublin.
 Charing Cross Hospital Gazette—Quarterly, 2/6 per annum—Charing Cross Hospital,
 Chandos Street, W.C.2.
 Child, The—Monthly 2/-; 21/- per annum—Bale, 83-91, Great Titchfield Street, W.1.
 Children's Diseases, British Journal of—Quarterly 7/6; 25/- per annum—Adlard & Son
 and West Newman Ltd., 23, Bartholomew Close, E.C.1.
 Clinical Journal—Weekly 6d.; 26/- per annum—Lewis, 136, Gower Street, W.C.1.
 Clinical Research, Journal of—Quarterly 1/- —The Clinical Research Association Lim.,
 Watergate House, York Buildings, Adelphi, W.C.2.
 Dental Journal, British—1st and 15th, 1/- —23, Russell Square, W.C.1.
 Dental Record—Monthly, 1/-: 10/6 per annum—Alston House, Newman Street, W.1.
 Dental Science, British Journal of—Monthly 1/-; 10/6 per annum—Bale, 83-91, Great
 Titchfield Street, W.1.
 Dental Surgeon—Weekly 4½d.; 20/- per annum—Baillière, 8, Henrietta Street, W.C.2.
 Dentists' Register—Yearly 10/6—Constable, 10, Orange Street, W.C.2.
 Dermatology and Syphilis, British Journal of—Monthly, 4/-; 42/- per annum—H. K.
 Lewis & Co. Lim., 136, Gower Street, W.C.1.

- Edinburgh Medical Journal—Monthly, 4/- net; 40/- per annum—Oliver & Boyd, Tweeddale Court, Edinburgh.
- Glasgow Medical Journal—Monthly 3/-; 30/- per annum—70, Mitchell Street, Glasgow.
- Guy's Hospital Gazette—Fortnightly 9d.; 10/- per annum—Ash & Co. Lim., Henry Street, Bermondsey Street, S.E.1.
- Guy's Hospital Reports—Quarterly, 12/6 net; 42/- per annum—Henry Frowde and Hodder & Stoughton, 1, Bedford Street, Strand, W.C.2.
- Heart: A Journal for the Study of the Circulation—Quarterly, 37/6 per annum—Shaw & Sons, Lim., 7, Fetter Lane, E.C.4.
- Homœopathic Journal, British—Quarterly, 3/6—Bale, 83-91, Gt. Titchfield Street, W.1.
- Homœopathic World—Monthly 9d.; 10/- per annum—12A, Warwick Lane, E.C.4.
- Hospital and Health Review—Monthly, 6d; 7/- per annum—28 & 29, Southampton Street, W.C.2. (See *Advertisement*.)
- Hygiene, Journal of—Quarterly, 12/6—Cambridge University Press, Fetter Lane, E.C.4.
- Indian Medical Gazette—Monthly, Rs. 16 per annum—Thacker & Co., 2, Creed Lane, E.C.4. (See *Advertisement*.)
- Inebriety, British Journal of—Quarterly 2/6—Baillière, 8, Henrietta Street, W.C.2.
- Irish Journal of Medical Science (Official Organ of the Royal Academy of Medicine in Ireland)—Monthly, 2/6—Parkgate Printing Works, Dublin. (See *Advertisement*.)
- Lancet—Weekly 1/-; 42/- per annum—423, Strand, W.C.2. (See *Advertisement*.)
- Laryngology and Otology, Journal of—Monthly 4/-; 40/- per annum—Oliver & Boyd, Tweeddale Court, Edinburgh. (See *Advertisement*.)
- Laryngoscope, The—Monthly, 35/- per annum—Baillière, 8, Henrietta Street, W.C.2.
- London Hospital Gazette—Monthly 1/-; 10/- per annum—5, Rupert Street, E.1.
- Masseuses and Masseurs, Register of—Yearly, 3/6—157, Great Portland Street, W.1.
- Maternity and Child Welfare—Monthly 1/-; 10/6 per annum—Bale, 83-91, Great Titchfield Street, W.1.
- Medical Annual—Yearly 20/- net; Subscribers before publication 17/- net, post free—John Wright & Sons Lim., Bristol.
- Medical Directory—Yearly 36/- net—Churchill, 7, Great Marlborough Street, W.1.
- Medical Officer—Weekly 1s.; 42/- per annum (and Supplement monthly: The Jennerian)—36-38, Whitefriars Street, E.C.4. (See *Advertisement*.)
- Medical Press and Circular—Weekly 6d.; 21/- per annum—Baillière, 8, Henrietta Street, W.C.2. (See *Advertisement*.)
- Medical Register—Yearly 21/-—Constable, 10, Orange Street, W.C.2.
- Medical Review—Monthly 2/6; 30/- per annum—70, Finsbury Pavement, E.C.2.
- Medical Science, Abstracts and Reviews—Monthly, 3/-; 30/- per annum—Oxford University Press, Amen Corner, E.C.4.
- Medical Temperance Review—Quarterly 6d.—23, Bartholomew Close, E.C.1.
- Medical Times—Monthly, 6d.—8 & 9, St. Alban's Place, Islington, N.1.
- Medical World—Weekly 1/-; 52/- per annum—14, Gray's Inn Square, W.C.1.
- Medical Year Book—Yearly 12/6—Wm. Heinemann Ltd., 20, Bedford Street, W.C.2.
- Medical and Dental Students' Register—Yearly 2/6—10, Orange Street, W.C.2.
- Medical and Nursing Homes Directory—Yearly 9d.—28 & 29, Southampton Street, W.C.2.
- Mental Science, Journal of—Quarterly 7/6—7, Great Marlborough Street, W.1.
- Middlesex Hospital Journal—Six issues, 1/- each—Middlesex Hospital, W.1.
- Midland Medical Journal—Monthly 4d.—Birmingham Printers Lim., Birmingham.
- Mind—Quarterly, 4/6; 16/- per annum—Macmillan, St. Martin's Street, W.G.2.
- Midwives' Roll—Yearly 42/-—Spottiswoode, 1, New Street Square, E.C.4.
- National Medical Journal—National Medical Union, 11, Chandos Street, W.1.
- Neurology and Psychiatry, Review of—30/- per annum—15, Frederick St., Edinburgh.
- Neurology and Psychopathology, Journal of—Quarterly, 3/6 net; 30/- per annum—Wm. Heinemann Ltd., 20, Bedford St., W.C.2.
- Obstetrics and Gynaecology of the British Empire, Journal of—Quarterly 12/6—34, Cross Street, Manchester.
- Ophthalmology, British Journal of—Monthly, 5/-; 42/- per annum—Pulman & Sons Lim., 24, Thayer Street, W.1.
- Parasitology—Quarterly 15/-—Cambridge University Press, Fetter Lane, E.C.4.
- Pathology and Bacteriology, Journal of—Quarterly, 40/- per annum—Oliver & Boyd, Edinburgh.
- Physiological Abstracts—Monthly, 42/- per annum—136, Gower Street, W.C.1.
- Physiology (Experimental), Quarterly Journal of—40/- per volume—Chas. Griffin & Co. Lim., Exeter Street, W.C.2.
- Physiology, Journal of—Quarterly, 30/- per volume—Fetter Lane, E.C.4.
- Practitioner—Monthly 4/-; 42/- per annum—2, Howard Street, Strand, W.C.2.
- Prescriber—Monthly, 2/-; 20/- per annum—6, South Charlotte Street, Edinburgh. (See *Advertisement*.)
- Psyche—Quarterly, 5/- net—68-74, Carter Lane, E.C.
- Psychology, British Journal of—Quarterly (Medical Section), 30/-; (General Section), 30/- net per volume—Cambridge University Press, Fetter Lane, E.C.4.

- Public Health—Monthly 2/6; 31/6 per annum—1, Upper Montague Street, W.C.1.
 Quarterly Journal of Medicine—Quarterly 10/6; 35/- per annum—Oxford University Press Amen Corner E.C.4.
 R.A.M.C., Journal of the—Monthly 2/- —Bale, 83-91, Great Titchfield Street, W.1.
 Radiology and Electrotherapy, Archives of—Monthly 4/-; 42/- per annum—Wm. Heinemann Ltd., 20, Bedford Street, W.C.2.
 Röntgen Society, Journal of the—Quarterly 5/- net; 20/- per annum—Percy Lund, Humphries & Co. Lim., 3, Amen Corner, E.C.4.
 Royal Naval Medical Service, Journal of the—Quarterly, 6/- net; 20/- per annum—83-91, Great Titchfield Street, W.1.
 Royal Sanitary Institute, Journal of the—Monthly 1/-—12, Long Acre, W.C.2.
 Royal Society of Medicine, Proceedings of the—Monthly 10/6 net; 105/- per annum—Longmans, Green & Co., 39, Paternoster Row, E.C.4.
 School Hygiene—Quarterly 1/6—23, Bartholomew Close, E.C.1.
 South African Medical Record—Fortnightly 1/3; 31/6 per annum—Bailliére, 8, Henrietta Street, W.C.2.
 St. Bartholomew's Hospital Journal—Monthly 9d.; 7/6 per annum—Students' Union, St. Bartholomew's Hospital, E.C.1.
 St. George's Hospital Gazette—At intervals, 6d.—83-91, Great Titchfield Street, W.1.
 St. Mary's Hospital Gazette—Monthly, 10/- per annum—56, Porchester Road, W.2.
 St. Thomas's Hospital Gazette—Six times per annum for 7/6—St. Thomas's Hospital, S.E.1.
 St. Thomas's Hospital Reports—Yearly 8/6—7, Great Marlborough Street, W.1.
 State Medicine, Journal of—Monthly, 2/- —37, Russell Square, W.C.1.
 Surgery, British Journal of—Quarterly, 12/6 net; 42/- per annum—John Wright & Sons Lim., Bristol. (See Advertisement.)
 Surgery, Gynaecology, and Obstetrics, and International Abstract of Surgery—Monthly 7/6; 75/- per annum—Bailliére, 8, Henrietta Street, W.C.2.
 Tropical Diseases Bulletin—Monthly, 2/6; 25/- per annum—23, Endsleigh Gardens, N.W.1.
 Tropical Medicine and Hygiene, Journal of—Fortnightly 1/6; 30/- per annum—Bale, 83-91, Great Titchfield Street, W.1.
 Tropical Medicine and Hygiene, Year Book of—Yearly 7/6—Bale, 83-91, Great Titchfield Street, W.1.
 Tropical Medicine and Parasitology, Annals of—Quarterly, 7/6; 22/6 per annum—177, Brownlow Hill, Liverpool.
 Tubercle—Monthly 2/6; 25/- per annum—Bale, 83-91, Great Titchfield Street, W.1.
 Tuberculosis, British Journal of—Quarterly 2/6—Bailliére, 8, Henrietta Street, W.C.2. (See Advertisement.)
 University College Hospital Magazine—Oct. to March, 7/- per annum—Bale, 83-91, Great Titchfield Street, W.1.
 West London Medical Journal—Quarterly 2/-—83-91, Great Titchfield Street, W.1.
 Westminster Hospital Reports—Yearly 3/- —20, Warwick Square, E.C.4.

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Artificial Eyes, Limbs and Orthopaedic Appliances.

- Braid, A. E. & Co. Lim., 30, Gower Place, Gower Street, W.C.1
 Critchley, J. & Sons, 18, Gt. George Street, Liverpool
 Desoutter Brothers Lim., 73, Baker St., W.1
 Evans, A. E., 38, Fitzroy Street, W.1
 Grossmith, W. R. Lim., 12, Burleigh St., Strand, W.C.2
 Haywood, J. H. Lim., Castle Gate, Nottingham
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Bandages and Antiseptic Dressings.

- Braid, A. E. & Co. Lim., 30, Gower Place, Gower Street, W.C.1
 Grout & Co. Lim. (Inc. The Norwich Crape Co. (1856), Lim.), Great Yarmouth
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Bottle Manufacturers and Merchants.

- Beatson, Clark & Co. Lim., Rotherham
 Isaacs, I. & Co., The North London Glass Bottle Works, 106, Midland Road, N.W.1 (Dispensing Bottles)

Dietetic Articles (Manufacturers of).

- Brand & Co. Lim., Mayfair Works, Vauxhall, S.W.8
 Brown, Gore & Co., 40, Trinity Square, E.C.3 (Gautier Frères' Brandy)
 Burrow, W. & J. Lim., The Springs, Malvern (Waters)
 Cadbury Bros. Lun., Bournville, Birmingham
 Cammell Lim., 112, Pembroke Street, N. (Waters)
 Fletcher, Fletcher & Co. Lim., Thane Rd., Holloway, N.7

Ingram & Royle Lim., Bangor Wharf,
45, Belvedere Road, S.E.1 (Waters)
Oxo Lim., Thames House, E.C.4
Rattray, A. Dewar, 188, Dumbarton Road,
Partick, Glasgow (Wines and Spirits)
Valentine's Meat-Juice Co., Richmond,
Virginia, U.S.A.

Druggists (Principal Wholesale).

Allen & Hanburys Lim., Bethnal Green,
E.2, and 37, Lombard Street, E.C.3
Alliance Drug & Chemical Co., 10, Beer
Lane, Great Tower Street, E.C.3
Anglo-American Pharmaceutical Co. Lim.,
Dingwall Road, Croydon
Anglo-French Drug Co. Lim., 238a, Gray's
Inn Road, W.C.1
Bayer Products Lim., 1, Warple Way,
Uxbridge Road, W.3.
Boots Pure Drug Co. Lim., Station Street,
Nottingham
British Colloids Lim., (The Crookes
Laboratories), 22, Chenies Street,
W.C.1
British Dyestuffs Corporation Lim., 70,
Spring Gardens, Manchester
Burroughs Wellcome & Co., Snow Hill
Buildings, E.C.1
Chinosol Hygienic Co., 48, Cranwich Road,
N.16
Clayton Aniline Co. Lim., 68½, Upper
Thames Street, E.C.4
Dick, Coates & Co., 41, Great Tower
Street, E.C.3
Drug and Chemical Corporation Lim., 41,
Lower Kennington Lane, S.E.11
Duncan, Flockhart & Co., 104-108, Holy-
rood Road, Edinburgh, and 155, Far-
ringdon Road, London
Edme Lim., Broad Street House, E.C.
Fellows Medical Mfg. Co., Incorporated,
26, Christopher Street, New York
Ferris & Co. Lim., Bristol
Fletcher, Fletcher & Co. Lim., Thane
Road, Holloway, N.7
Genatosan, Lim., 143, Great Portland
Street, W.1
Giles, Schacht & Co., Clifton, Bristol
Guyot-Guenin & Son, 67, Southwark
Bridge Road, S.E.
Hammond (Featherstone) Partners Lim.,
28, Victoria Street, Westminster, S.W.1
Handford & Dawson, Harrogate
Hewlett, C. J. & Son Lim., 36-42, Char-
lotte Street, E.C.2
Hoffmann-La Roche Chemical Works
Lim., 7 and 8, Idol Lane, E.C.3
Howards & Sons Lim., Ilford, E.
Kerol Lim., Castlegate, Newark (Dis-
infectant)
Kolynos Incorporated, Chenies Street,
W.C.1 (Dental Cream)
Martindale, W., 10, New Cavendish
Street, W.1
Matthews, H. E. & Co., Clifton, Bristol
May, Roberts & Co. Lim., 7-13, Clerken-
well Road, E.C.1
Midgley, Chas. Lim., Manchester

Newbery, F. & Sons Lim., Charterhouse
Square, E.C.1
Parke, Davis & Co., 50-54, Beak Street,
Regent Street, W.1
Phillips (Chas. H.) Chemical Co., 179-181,
Acton Vale, W.3
Reynolds & Branson Lim., 13, Briggate,
Leeds
Richards, John Morgan & Sons Lim., 46-
47, Holborn Viaduct, E.C.1
Roberts & Co., 76, New Bond Street, W.
St. Amand Manufacturing Co. Lim., Carn-
wath Road, Fulham, S.W.6
S. P. Charges Co., St. Helens, Lancs.
Salamon & Co. Lim., Rainham, Essex
Savory & Moore Lim., 143, New Bond
Street, W.1
Simpson & Co., 22d, Ebury Street, S.W.1
Southall Bros. & Barclay Lim., Birming-
ham
Squire & Sons Lim., 413, Oxford Street,
W.1
Sumner, R. & Co. Lim., 40, Hanover
Street, Liverpool
Willows, Francis, Butler & Thompson
Lim., 40, Aldersgate Street, E.C.1
Woolley, Jas., Sons & Co. Lim., Victoria
Bridge, Manchester
Wyleys Lim., Coventry
Zimmermann, A. & M., Linn., 3, Lloyds
Avenue, E.C.3

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Street, Holborn, E.C.1
Fallowfield (Jonathan) Lim., 61-62, New-
man Street, W.1 (x-ray Photographic
supplies)
Flatters & Garnett Lim., 309, Oxford
Road, Manchester (Microscopical
Apparatus)
Kodak Lim. (X-Ray Dept.), Kingsway,
W.C.2
Mottershead & Co., 7, Exchange Street,
Manchester
Newton & Wright Lim., 471-473, Hornsey
Road, N.19
Rogers Electric Sales Co., 180, Gray's Inn
Road, W.C.1
Siemens Brothers & Co. Lim., Woolwich,
S.E.18
The Tintometer Lim., The Friary, Salis-
bury (Scientific Instruments)

Hospital Bed and Furniture Manufacturers.

Hoskins & Sewell Lim., Birmingham

Motor Car Manufacturers and Agents, and Accessories.

Henlys Lim., 91, 155 & 157, Great Portland
Street, W.1
Standard Motor Co. Lim., Coventry

Opticians.

Armstrong, Thos. & Brother, Lim., 78, Deansgate, Manchester
 Bruce, Green & Co. Lim., 14-18, Bloomsbury Street, W.C.1
 Spiller, Geo., Lim., 32, Wigmore St., W.1

Printers (Medical).

Bale, John Sons & Danielson Lim., 83-91, Great Titchfield Street, W.1
 Cassell & Co. Lim., La Belle Sauvage, Ludgate Hill, E.C.4
 Wright, John & Sons Lim., Bristol

Publishers and Booksellers (Medical).

Adlard & Son and West Newman Lim., 23, Bartholomew Close, E.C.1
 Allen (Geo.) & Unwin Lim., 40, Museum Street, W.C.1
 Appleton, D. & Co., 25, Bedford Street, Covent Garden, W.C.2
 Arnold, Edward & Co., 41 & 43, Maddox Street, W.1
 Baillière, Tindall & Cox, 8, Henrietta Street, W.C.2
 Bale, John Sons & Danielsson Lim., 83-91, Great Titchfield Street, W.1
 Black, A. & C., Lim., Soho Square, W.1
 Bryce, William, 54 & 54a, Lothian Street, and 15, Teviot Place, Edinburgh (Bookseller)
 Butterworth & Co., Bell Yard, Temple Bar, W.C.2
 Cambridge University Press (C. F. Clay), Fetter Lane, E.C.4
 Cassell & Co. Lim., La Belle Sauvage, Ludgate Hill, E.C.4
 Churchill, J. & A., 7, Great Marlborough Street, W.1
 Constable & Co. Lim., 10-12, Orange Street, W.C.2
 Cornish Bros. Lim., 39, New Street, Birmingham
 Ellis, H. R., 9, Lovell's Court, Paternoster Row, E.C.4 (Bookseller)
 Fannin & Co. Lim., Grafton Street, Dublin (Booksellers)
 Foyle, W. & G. Lim., 121-125, Charing Cross Road, W.C.2 (Booksellers)
 Galloway, James, 3, Teviot Place, Edinburgh (Bookseller)
 Green, W. & Son Lim., St. Giles Street, Edinburgh
 Griffin, Chas. & Co. Lim., 12, Exeter Street, Strand, W.C.2
 Heinemann, William (Medical Books) Lim., 20, Bedford Street, W.C.2
 Homoeopathic Publishing Co., 12a, Warwick Lane, E.C.4
 Kimpton, Henry (Hirschfeld Bros. Lim.), 263, High Holborn, W.C.1
 Lewis, H. K. & Co. Lim., 136, Gower Street, & 24 & 28, Gower Place, W.C.1
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 Maclehose, Jackson & Co., 73, West George Street, Glasgow
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 Oxford Medical Publications (Henry Frowde and Hodder & Stoughton), 1 & 2, Bedford Street, Strand, W.C.2
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 Paul (Kegan), Trench, Trubner & Co. Lim., 68-74, Carter Lane, E.C.4
 Pulman, Geo. & Sons Lim., 24, Thayer Street, W.1
 Putnam's, G. P., Sons, Lim., 24, Bedford Street, W.C.2
 Saunders, W. B. Co., Lim., 9, Henrietta Street, W.C.2
 Scientific Press Lim., 28 and 29, Southampton Street, W.C.2
 Shaw & Sons Lim., 7-9, Fetter Lane, E.C.4
 Sherratt & Hughes, University Press, 34, Cross Street, Manchester
 Simpkin, Marshall, Hamilton, Kent & Co. Lim., Stationers' Hall Court and Paternoster Row, E.C.4
 Thacker, W. & Co., 2, Creed Lane, E.C.4 (Thacker, Spink & Co., Calcutta)
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 Wright, John & Sons Lim., Bristol (and Printers); London Depôt, Stationers' Hall Court, E.C.4

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 Hobson, J. T. & Co., Bedford

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Alexander & Fowler, 104 and 106, Pembroke Place, Liverpool
 Allen & Hanburys Lim., 48, Wigmore Street, W.1
 Ash, Claudius Sons & Co. Lim., 5-12, Broad Street, Golden Square, W.1
 Bailey, W. H. & Son Lim., 45, Oxford St., W.1, and 2, Rathbone Place, W.1
 Bell (John) & Croyden Lim. (incorporating Arnold & Sons), 50, Wigmore Street, W.1, and Giltspur Street, E.C.1
 Braid, A. E. & Co. Lim., 30, Gower Place, Gower Street, W.C.1
 Critchley, J. & Sons, 18, Great George Street, Liverpool
 De Trey & Co. Lim., 23, Swallow Street, Piccadilly, W.1 (Dental)

Dental Manufacturing Co. Lim., Alston House, Newman Street, W.1
 Domen Belts Co. Lim., 456, Strand, W.C.2
 Down Bros. Lim., 21 & 23, St. Thomas's Street, S.E.1
 Dowsing Radiant Heat Co. Lim., 91 & 93, Baker Street, W.1
 Evans, A. E., 38, Fitzroy Street, W.1
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It is easier to make a note of a thing than to remember *where* the note was made. If entered in the following pages any note can be immediately found when required.

1924

JANUARY.	
Su	* 613 20 27
M	* 714 21 28
Tu	1 815 22 29
W	2 916 23 30
Th	810 17 34 81
F	411 18 25 *
S	512 19 26 *

NOTES.

Copy here any formula or fact you wish
to keep for reference.

1924

FEBRUARY.	
Su	* 810 17 24 *
M	* 411 18 25 *
Tu	* 512 19 26 *
W	* 613 20 27 *
Th	* 714 21 28 *
F	1 815 22 29 *
S	2 916 23 30 *

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1924

MARCH.	
25	* 2 916 24 80
U	* 3 1017 21 81
Tu	* 4 11 18 25 *
W	* 5 12 19 26 *
Th	* 6 13 20 27 *
F	* 7 14 21 28 *
S	* 8 15 22 29 *

NOTES.

1924

APRIL.	
25	* 6 18 20 27
U	* 7 14 21 28
Tu	1 8 15 22 29
W	2 9 16 23 30
Th	3 10 17 24 *
F	4 11 18 25 *
S	5 12 19 26 *

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See Advertisement, p. xxxviii.

1924

MAY.	
S	* 411 18 25
M	* 512 19 26
Tu	* 613 20 27
W	* 714 21 28
Th	1 815 22 29
F	2 916 23 30
S	3 1017 24 '1

NOTES.

1924

JUNE.	
S	1 815 22 29
M	2 916 23 30
Tu	3 1017 24 *
W	4 1118 25 *
Th	5 1219 26 *
F	6 1320 27 *
S	7 1421 28 *

VERAMON

(See page 609)

Analgesia without hypnosis.
Indicated in all forms of head-
ache, toothache, dysmenorrhœa,
etc.

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1924

JULY.	
S	* 613 30 27
M	* 714 31 24
Tu	1 815 23 20
W	2 916 23 10
Th	3 1017 24 01
F	4 1118 25 *
S	5 1219 26 *

NOTES.

1924

AUGUST.	
S	* 31017 24 01
M	* 41118 25 *
Tu	* 51219 26 *
W	* 613 20 27 *
Th	* 714 21 28 *
F	1 815 22 29 *
S	2 916 23 30 *

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(See page 609)

A gonococcal vaccine, on a
new principle, for all gonor-
rhœal complications.

Importers :

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1924

SEPTEMBER.	
S	* 7142123
1	8152129
Tu	2 9162180
W	3101724 *
Th	4111825 *
F	5121926 *
S	6132027 *

NOTES.

1924

OCTOBER.	
S	* 8121926
1	* 9132027
Tu	* 7142128
W	1 8152229
Th	2 9162330
F	310172431
S	4111825 *

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(See page 609)

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leprosy. *Non-toxic in
effective doses.*

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1924

NOVEMBER.	
S	* 2 9 16 23 30
M	* 3 10 17 24
Tu	* 4 11 18 25
W	* 5 12 19 26
Th	* 6 13 20 27
F	* 7 14 21 28
S	* 8 15 22 29

NOTES.

1924

DECEMBER	
S	* 7 14 21 28
M	1 8 15 22 29
Tu	2 9 16 23 30
W	3 10 17 24 31
Th	4 11 18 25
F	5 12 19 26
S	6 13 20 27

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1925

JANUARY.	
S	* 4 11 18 25
M	* 5 12 19 26
Tu	* 6 13 20 27
W	* 7 14 21 28
Th	1 8 15 22 29
F	2 9 16 23 30
S	3 10 17 24 31

NOTES.

1925

FEBRUARY.	
S	1 8 15 22 *
M	2 9 16 23 *
Tu	3 10 17 24 *
W	4 11 18 25 *
Th	5 12 19 26 *
F	6 13 20 27 *
S	7 14 21 28 *

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See Advertisement, page 604

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Those marked with an asterisk (*) in the E column have not returned our last form, but we give their latest revised figures.

TITIF, ETC., OF OFFICE.	A	B	C	D	E
Abstainers and General Insurance Co., Ltd., Edmund St., Birmingham. <i>Man. Director</i> , H. J. Greening P	1883	40/11	55/10	82/3	£ 1 584,968
Alliance Assurance Co., Ltd., Bartholomew Lane, E.C. <i>Gen. Man.</i> , O. Morgan Owen P	1824	49/1	65/1	90/10	18 648,732
Atlas Assurance Co. Ltd., 92, Cheapside, E.C. 2. <i>Gen. Man.</i> , C. H. Falloon. <i>Act.</i> , William Penman P	1808	49/3	63/7	88/8	3,606,728
Australian Mutual Provident Society. Life, Endowments and Annuities, 73-76, King William Street, E.C. 4. <i>Manager</i> for U.K., W. C. Fisher. Further particulars see page 9 M	1849	48/2	64/5	89/10	49-448,175
Britannic Assurance Co., Ltd., Life, En- dowment Assurances, House Purchase, Broad St. Corner, Birmingham. <i>Chairman</i>, J. A. Patrick, J.P. <i>Secretary</i>, J. M. Laing. F.I.A. Further particulars see page 8 P	1866	47/9	64/-	91/1	8,000,000
British Equitable Assurance Co. Ltd., 1, 2, 3, Queen Street Place, E.C. <i>Manager</i> , Basil May, F.I.A. P	1854	48/8	64/11	91/9	1,500,000
Caledonian Insurance Co., 19, George Street, Edinburgh. <i>Gen. Man.</i> , R. Hill Stewart, F.F.A. London Offices, 82, King William St., E.C., and 16, Pall Mall, S.W. P	1805	48/9	64/6	88/6	4,398,167
Canada Life Assurance Co., 15, King Street, Cheapside, E.C. <i>Man.</i> , J. R. Wandless. F.I.A. P	1847	48/5	65/4	94/2	17,200,756
Clerical, Medical, and General Life Assurance Society, 15, St. James's Square, S.W., and 8, King William Street, E.C. <i>Gen. Man. &</i> <i>Act.</i> , A. D. Besant P	1824	47/6	65/2	94/10	7,493,768
Colonial Mutual Life Assurance Society Ltd., 33, Poultry, E.C. <i>Man.</i> , Arthur E. Gibbs. <i>Assist. Man.</i> , Ernest A. Cawdron, J.P. M	1873	48/9	65/1	89/10	6,643,955
Commercial Union Assurance Co. Ltd., 24, 25, and 26, Cornhill, L.C. <i>Act.</i> , A. G. Allen P	1861	47/10	65/2	92/4	10,211,458
Co-operative Insurance Society Ltd., 109, Corporation Street, Manchester. <i>Man.</i>, J. P. Jones. Further particulars see page 10 M	1867	47/4	63/1	90/1	1,888,241
Eagle Star & British Dominions Insurance Co. Ltd. Head Office, British Dominions House, Royal Exchange Avenue, E.C. 3; Life Dept., 32, Moorgate, E.C. 2. <i>Man.</i> <i>Dir.</i>, Sir Edward M. Mountain, Bart, J.P. Further particulars see page 7 P	1807	49/9	66/3	93/8	13,801,134
Equitable Life Assurance Society, Mansion House Street, E.C. 2. <i>Act. & Man.</i> , W. Palin Elderton, F.I.A. M	1762	54/-	64/-	92/-	5,249,511
Equity & Law Life Assurance Society, 18, Lincoln's Inn Fields, W.C. <i>Man. & Sec.</i> , W. P. Phelps, M.A., F.I.A. P	1844	48/10	64/6	90/9	5,153,336
Friends' Provident & Century Life Office, 42, Kingsway, W.C. 2, and 18 Charlotte Square, Edinburgh. <i>Gen. Man.</i>, Henry J. Tapscott. <i>Act.</i>, Alfd Moorhouse, F.I.A. Further particulars see page 11. M	1832	48/-	64/3	89/9	4,020,259
General Accident Fire and Life Assurance Corporation Ltd., Perth, Scotland <i>Director</i> & <i>Gen. Man.</i> , F. North-Miller, J.P. P	1885	49/2	64/11	91/3	156 367

A, when Established; B, C, D, Annual Premiums to Insure £100 on death, with Profits, at the age of 30, 40, and 50; E, Assurance and Annuity Funds, exclusive of Paid-up Capital; M, Mutual Offices; P, Proprietary Offices.

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†The Legal and General Assurance are not for the present issuing Policies under *with Profit* tables.

TITLE, ETC., OF OFFICE.	A	B	C	D	E
General Life Assurance Co., 103, Cannon Street, E.C. 4. <i>Sec.</i> , Albert Burton Nye. P	1837	49/10	65/4	92/8	⁶ 41,975,234
Gresham Life Assurance Society Ltd., 188-190, Fleet Street, E.C. 4. <i>Gen. Man. & Sec.</i> , Alexander Lawson .. P	1848	47/6	62/10	88/6	6,520,189
Guardian Assurance Co. Ltd., 68, King William Street, and 21, Fleet St., E.C. <i>Gen. Man.</i> , Geo. W. Reynolds. <i>Act.</i> , W. P. Cook P	1821	48/10	64/6	89/3	5,015,310
Law Union and Rock Insurance Co. Ltd., 7, Chancery Lane, W.C. <i>Sec.</i> , J. Stirling P	1806	48/4	64/-	89/10	9,005,577
†Legal & General Assurance Society Ltd., 10, Fleet St., E.C. <i>Gen. Man.</i> , W. A. Workman P	1836	36/4	50/8	74/8	14,509,701
Life Association of Scotland, 82, Princes St., Edinburgh. <i>Man. & Act.</i> , R. M. M. Roddick. <i>Sec.</i> Alex. Prentice. London Office, 28, Bishopsgate, E.C. <i>Sec.</i> , G. S. N. Cartel, F.I.A. ..	1838	48/11	64/10	91/1	5,670,138
Liverpool and London and Globe Insurance Co. Ltd., 1, Dale Street, Liverpool. <i>Gen. Man & Sec.</i> , Hugh Lewis. London Office, 1, Cornhill, E.C. .. P	1836	49/10	65/9	50/3	5,815,179
London and Scottish Assurance Corporation Ltd., 66-67, Cornhill, E.C. <i>Sec.</i> , Louis I. Jarvis. <i>Int. Asst. Secs.</i> , E. E. Dent and L. C. Kestin. <i>Act.</i> , Harold Dougharty P	1862	48/9	64/9	91/2	*4,440,141
London Assurance Corporation, 1, King William St., E.C. <i>Man.</i> , of Life Dept. and <i>Act.</i> , A. G. Hemming, F.I.A. .. P	1720	49/-	64/8	90/2	3,380,986
London Life Association, Ltd., 81, King William Street, E.C. <i>Act. & Man.</i> , H. M. Trouncer, M.A., F.I.A. .. M	1806	47/-	61/8	85/4	7,544,056
Marine and General Mutual Life Assurance Society, 14, Leadenhall Street, E.C. <i>Act. & Sec.</i> , Howard T. Cross, F.I.A. .. M	1852	48/10	65/-	91/6	2,453,020
Medical Sickness Annuity & Life Assurance Society Ltd., 300, High Holborn, W.C. <i>Man. & Sec.</i> , Bertram Sutton, F.C.I.L. M	1884	40/2	55/3	80/-	368,241
Metropolitan Life Assurance Society, 13, Moorgate, E.C. 2. <i>Act. & Man.</i> , H. J. Baker, F.I.A. .. M	1835	49/9	66/4	92/-	2,367,499
Mutual Life and Citizens' Assurance Co. Ltd. (of Australia), Effingham H.D., 1, Arundel St. National Mutual Life Assurance Society, 39, King Street, Cheapside, E.C. <i>Act. & Man.</i> , G. Marks, C.B.E., F.I.A. <i>Asst. Act.</i> , G. H. Recknell, F.I.A., F.F.A. <i>Sec.</i> , G. V. S. Booth. .. M	1886	48/9	65/3	89/9	13,226,298
National Mutual Life Association of Australasia, Ltd., 5, Cheapside, E.C. <i>Man.</i> , H. W. Meyers. .. M	1830	48/4	63/7	89/6	3,798,916
National Provident Institution, 48, Gracechurch Street, E.C. <i>Act. & Sec.</i> , L. F. Hovell, F.I.A. .. M	1869	46/8	61/6	87/2	18,000,000
New York Life Insurance Co., Trafalgar Buildings, Trafalgar Square, London, W.C. <i>Sec.</i> , Wm R. Collinson, F.C.I.S. .. M	1835	50/2	66/3	91/1	*7,799,178
North British and Mercantile Insurance Co. Ltd. 61, Threadneedle St., E.C. 2, & 64, Princes St., Edinburgh. <i>Gen. Man.</i> , London, Sir A. Worley, C.B.E. <i>Gen. Man.</i> , Edin., Owen D. Jones .. P	1845	48/9	66/-	96/11	20,134,123
Northern Assurance Co. Ltd., 1, Moorgate, E.C. 2. <i>Gen. Man.</i> , W. Ainsas Mackay. <i>Ass' Gen. Man.</i> , K. K. Peters .. P	1800	49/10	66/1	91/11	20,209,650
Norwich Union Life Insurance Society, Norwich. <i>Gen. Man. & Act.</i> , M. Mackenzie Lees, F.F.A. <i>Sec.</i> , H. G. Wilton, F.I.A. London Office, 49, Fleet Street, E.C. 4. M	1836	49/-	64/8	90/10	5,033,138
Pearl Assurance Co. Ltd., 252, High Holborn, W.C. 1. <i>Man'g Director</i> , G. Shruballs, J. P. P	1808	51/9	66/6	92/5	20,418,689
	1864	49/-	65/-	92/-	23,916,781

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Phoenix Assurance Co. Ltd., Phoenix House, King William St., E.C. 4, Trafalgar House, Waterloo Place, S.W. 1, & 187, Fleet Street, E.C. 4. <i>Gen. Man.</i> , R. Y. Sketch. P	1732	48/11	64/7	90/8	*11,680,227
Provident Mutual Life Assurance Association, 25 to 37, Moorgate, E.C. 2. <i>Man. & Act.</i> , C. R. V. Coutts. M	1840	51/-	68/-	95/-	4,000,000
Prudential Assurance Co. Ltd., Holborn Bars. <i>Sec.</i> , Sir George May, K.B.E. Further particulars see page 9 P	1848	49/6	65/11	91/11	137,909,540
Refuge Assurance Co. Ltd., Oxford Street, Manchester. <i>Gen. Mans.</i> , J. Proctor Green and W. H. Aldcroft. London Office, 133, Strand, W.C. 2. P	1864	49/3	65/9	91/9	23,648,396
Royal Exchange Assurance, Royal Exchange, E.C. 3, and 44, Pall Mall, S.W. 1. <i>Act.</i> , T. F. Anderson, F.I.A., F.F.A. P	1720	49/-	64/9	90/2	5,602,764
Royal Insurance Co. Ltd., 1, North John St., Liverpool. <i>Gen. Man.</i> , J. J. Atkinson. London Offices, 24-28, Lombard Street. <i>London Man.</i> , R. McConnell. P	1845	48/8	64/4	90/4	14,743,375
Scottish Amicable Life Assurance Society, St. Vincent Place, Glasgow. <i>Gen. Man.</i> , W. Hutton. <i>Sec. & Act.</i> , R. Gordon-Smith. London Office, 1, Threadneedle St., E.C. 2. <i>Sec. H. Robertson</i> . M	1826	51/9	66/3	90/1	7,104,973
Scottish Equitable Life Assurance Society 28, St. Andrew Square, Edinburgh. <i>Gen. Man.</i> , C. Guthrie. <i>Sec.</i> , A. H. Lough. London Office, 13, Cornhill, E.C. 3. <i>Sec.</i> , P. W. Purves. (<i>Premiums cease at age 75</i>) M	1831	50/6	67/6	97/-	5,918,455
Scottish Life Assurance Co. Ltd., 19, St. Andrew Square, Edinburgh. <i>Man.</i> , Lewis P. Orr, F.F.A., F.R.S.E. London Office, 9 & 10, King Street, E.C. 2. <i>Sec.</i> , I. Campbell. P	1881	49/5	64/6	90/5	3,502,450
Scottish Provident Institution, 6, St. Andrew Square, Edinburgh. <i>Man.</i> , R. T. Boothby. <i>Joint Secs.</i> , C. W. Thomson, & A. Graham Donald. <i>Act.</i> , W. G. Walton. London Offices, 3, Lombard St. E.C. 2, and 17, Pall Mall, S.W. M	1837	42/4	56/6	83/2	17,500,000
Scottish Temperance & British General Assurance Co., Ltd., 107, St. Vincent Street, Glasgow. <i>Manager</i> , Adam K. Rodger. London, 2, 3 & 4, Cheapside. <i>Man.</i> , R. J. Moss. (<i>Less 10 per cent to Abolitionists</i>) P	1883	48/6	63/9	89/10	3,692,722
Scottish Union & National Insurance Co., 35, St. Andrew Square, Edinburgh. <i>Gen. Man.</i> , J. A. Cook. London Office, 5, Walbrook, E.C. 4. <i>Sec.</i> , James G. Nicoll. P	1824	50/-	65/8	92/-	8,932,182
Scottish Widows' Fund Life Assurance Society, 9, St. Andrew Square, Edinburgh. <i>Man. & Act.</i> , G. J. Lidstone. <i>Sec.</i> , Geo C. Stenhouse. London Offices, 28, Cornhill, E.C. 3, and 17, Waterloo Place, S.W. 1 M	1815	51/9	66/3	90/7	23,411,075
Standard Life Assurance Co., 3, George Street, Edinburgh. <i>Man.</i> , S. E. Macnaghten. London Offices, 110, Cannon Street, E.C. 2. <i>Sec.</i> , A. B. Drayton, and 15a, Pall Mall. <i>Sec.</i> , E. V. Goodall. P	1825	48/11	64/5	89/-	*13,550,000
Sun Life Assurance Society, 63, Threadneedle Street, E.C. 2. <i>Sec. & Gen. Man.</i> , E. Linnell. <i>Act.</i> , R. G. Salmon, F.I.A. <i>Assistant Sec.</i> , G. M. Scarle, F.I.A. P	1810	49/2	66/6	94/2	*13,283,577
Sun Life Assurance Co. of Canada, Sun of Canada House, Victoria Embankment (near Temple Station), W.C. 2. <i>Man.</i> , J. I. Junkin. P	1865	48/5	65/4	94/1	34,784,777

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United Kingdom Provident Institution, 196, Strand, W.C. 2, Sec., H. W. Hasler. Act, C. C. Nichol, B.A., F.I.A., F.F.A. Asst. Act. W. G. Barrett, F.I.A. M	1840	50/3	66/7	92/7	£ 11,000,000
University Life Assurance Society, 25, Pall Mall, S.W. 1. Act. & Sec., R. Todhunter, M.A. P	1825	52/1	68/9	94/10	986,476
Wesleyan & General Assurance Society, Life, House Purchase, Annuities, Sickness, Assurance Buildings, Steelhouse Lane, Birmingham. Gen. Man., A. I. Hunt. London Office, Halton House, 20-23, Holborn, E.C. 1. Further particulars see page 8 M	1841	48/1	65/8	93/10	4,890,132
Yorkshire Insurance Company, Ltd., Chief Offices: St. Helen's Square, York. Bank Buildings, Princes Street, E.C. 2. London Branches, 17, Mincing Lane, E.C. 3; 48, Pall Mall, S.W. 1. 49, Sloane Square, S.W. 1; 496, Brixton Road, S.W. 9; 6, Norfolk Street, Strand, W.C. 2; 43, Broadway, Stratford, E 15; 551, High Road, Tottenham, N. 17; 280, Euston Road, N.W. 1. Further particulars, page 2 P	1824	49/1	64/9	91/7	3,598,311

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The SCHOOL BUILDINGS are completely equipped and thoroughly up-to-date.

Classes and Lectures in the PRELIMINARY AND INTERMEDIATE SUBJECTS provide complete instruction for all University and the Conjoint Board Examinations.

The facilities for CLINICAL WORK are second to none in London. Clerks and Dressers, who work under the immediate supervision of the Visiting Staff, are appointed every three months in all General and Special Departments of the Hospital.

The institution of CLINICAL MEDICAL AND SURGICAL UNITS offers special advantages to those desiring advanced instruction and practice in these Subjects. The Unit Laboratories are fully equipped for the routine investigation of disease and for research work.

In connection with the Department of Obstetrics and Gynæcology all Students attend the practice of the MATERNITY WARD, before proceeding to work in the District.

The SPECIAL DEPARTMENTS IN THE HOSPITAL provide clinical instruction in all special Subjects.

SPECIAL CLASSES are held for the F.R.C.S., Primary and Final, and other higher Examinations.

HOUSE APPOINTMENTS, Resident and Non-Resident, and Salaried RESEARCH APPOINTMENTS are numerous, and are open to all Students after Qualification.

The SPORTS GROUND is within easy reach of the Hospital.

FEES :

£50 for each period of Twelve months.

Full particulars may be had from—

THE MEDICAL SECRETARY, ST. THOMAS'S HOSPITAL MEDICAL SCHOOL,
WESTMINSTER BRIDGE, S.E.1

ST. JOHN'S HOSPITAL

For Diseases of the Skin

(INCORPORATED).

IN-PATIENT DEPARTMENT (40 BEDS)—262 UXBRIDGE ROAD, W.12.
OFFICES AND OUT-PATIENT DEPARTMENT—
43, LEICESTER SQUARE, W.C.2.

OUT-PATIENT ATTENDANCES 1000 A WEEK.

The OUT-PATIENT DEPARTMENT contains Laboratory Lecture Room, Electrical Department and Medicated Vapour Baths. **VENEREAL DISEASES** are treated under the Government Scheme.

The attendance of the Hon. Medical Staff is as follows:—

MONDAY	... 2 p.m.	DR. GRIFFITH	6 p.m.	DR. HANNAY
TUESDAY	... 2 p.m.	DR. BUNCH	6 p.m.	DR. HANNAY
WEDNESDAY	... 2 p.m.	DR. SIBLEY	6 p.m.	DR. MACCORMAC
THURSDAY	... 2 p.m.	DR. MACCORMAC	6 p.m.	DR. GRIFFITH
FRIDAY	... 2 p.m.	DR. HANNAY	6 p.m.	DR. FOX
SATURDAY	... 2 p.m.	CLINIC		

The Hospital is now the recognized centre in London for the Post-Graduate Study of Diseases of the Skin. Teaching is carried out under the auspices of the

LONDON SCHOOL OF DERMATOLOGY.

Consulting Staff:

SIR MALCOLM MORRIS, K.C.V.O. DR. JAMES H. STOWERS.

Staff of Lecturers:

H. G. ADAMSON, M.D., F.R.C.P.	...	St. Bartholomew's Hospital
H. W. BARBER, M.B., F.R.C.P.	...	Guy's Hospital
J. L. BUNCH, M.D., M.R.C.P., D.Sc.	...	St. John's Hospital
HALDIN DAVIS, M.B., M.R.C.P., F.R.C.S.	...	Royal Free Hospital
S. ERNEST DORE, M.D., F.R.C.P.	...	St. Thomas's & Westminster Hosps.
WILFRID FOX, M.D., F.R.C.P.	...	St. George's & St. John's Hospitals
A. M. H. GRAY, C.B.E., M.D., F.R.C.P., F.R.C.S.	...	University College Hospital
W. GRIFFITH, M.B., M.R.C.P.	...	St. John's Hospital
M. G. HANNAY, M.D., M.R.C.P.	...	St. John's Hospital
E. GRAHAM LITTLE, M.D., F.R.C.P.	...	St. Mary's Hospital
H. MACCORMAC, C.B.E., M.D., F.R.C.P.	...	Middlesex & St. John's Hospitals
J. M. H. MACLEOD, M.D., F.R.C.P.	...	Charing Cross Hospital
J. H. SEQUEIRA, M.D., F.R.C.P., F.R.C.S.	...	London Hospital
W. KNOWSLEY SIBLEY, M.D., M.R.C.P.	...	St. John's Hospital
A. WHITFIELD, M.D., F.R.C.P.	...	King's College Hospital

Lectures and Demonstrations are given regularly during the Winter and Summer Session. Instruction is given daily in the Out-Patient Department as above. Special classes or individual teaching can be arranged in the Pathological Department. For fees and further particulars apply to the Dean (DR. M. G. HANNAY).

GEORGE A. ARNAUDIN,
Secretary.

COUNTY OF LONDON.

Maudsley Hospital

DENMARK HILL, S.E.5.

Medical Supt. - EDWARD MAPOTHER, M.D., M.R.C.P., F.R.C.S.

THIS HOSPITAL, organized by the London County Council on the lines of the combined Neurological and Psychiatric Clinics of the Continent and America, represents the first provision of its kind by a public body in this country. Its objects are:—

- (a) Research into the pathology and treatment of Nervous and Mental Disorders,
- (b) Instruction of Medical Students and advanced post-graduate courses in Psychological Medicine;
- (c) Facilities for diagnosis of difficult cases;
- (d) **TREATMENT** of all forms of Nervous Disorders (both organic and functional), including early and recoverable forms of mental disturbance.

Admission as in-patients of the psychoses is limited to those of good prognosis, except in very special cases for diagnosis or of particular value for research or teaching.

Approval by the Medical Superintendent is an indispensable preliminary.

Treatment is entirely on a voluntary basis. Every in-patient is required to sign an application form for admission, and is entitled to leave within 24 hours of notifying desire to do so; restriction of liberty while in Hospital is reduced to a minimum.

The special features of treatment at this Hospital for mental disturbances include (1) Complete absence of association with the certified insane and of the stigma connected with this, (2) Careful separation from admission of the quiet from restless cases; (3) A Medical Staff sufficiently numerous for modern individual psychotherapy; (4) All means of physical treatment; (5) The services of eminent specialists in various branches of medicine and surgery; (6) The co-operation of a Pathological Department under Dr. F. L. GOLLA, ensuring application of the most modern methods; (7) A very numerous, highly educated, and experienced nursing staff, almost entirely women.

OUT-PATIENTS are seen at 2 p.m. (Men on Mondays and Thursdays, Women and Children on Tuesdays and Fridays). All types of nervous and mental disorder are eligible for treatment in this Department.

IN-PATIENTS: Accommodation includes—

144 beds in Wards (72 Men, 72 Women). For these, London patients are required to contribute such part of the cost as they can afford. Others can only be admitted if prepared to pay the cost, at present £5 a week.

13 Private Rooms for Women Patients only (with special dietary, separate gardens, sitting and dining rooms). Charges from £6 6s. to £7 7s. a week.

All communications should be addressed to the *Medical Superintendent*.

JAMES BIRD,

Clerk of the London County Council.

ROYAL LONDON OPHTHALMIC HOSPITAL

(MOORFIELDS EYE HOSPITAL)

CITY ROAD, E.C. 1.

Gentlemen may enter on the practice of the Royal London Ophthalmic Hospital (Moorfields) at any time, and are on certain conditions eligible for appointment as Chief Clinical Assistant, Clinical Assistant, and Junior Assistant.

Two courses of Instruction, extending over a period of 5 months each, begin in October and March respectively:—

1. PRACTICAL REFRACTION CLASSES.
2. METHODS OF EXAMINATION (PRACTICAL) AND USE OF THE OPHTHALMOSCOPE.
3. LECTURES every evening, except Saturday, at 5.30—6.30,
On the following subjects:—(a) Anatomy; (b) Physiology; (c) Optics;
(d) Pathology; (e) Ophthalmic Medicine and Surgery:—
Consisting of:—Medical Ophthalmology, External Diseases of the Eye,
Motor Anomalies and Squint, Diseases of the Fundus.
4. CLINICAL LECTURES (Tuesdays at 5.30 p.m.).
5. PRACTICAL PATHOLOGY.
6. PRACTICAL BACTERIOLOGY.
7. OPERATIVE SURGERY.
8. OPHTHALMOSCOPIC CONDITIONS (Weekly demonstrations).
9. RADIOGRAPHY AND RADIOTHERAPY.
10. DISCUSSION CLASSES.

FEES.—A composition fee of 24 Guineas will entitle the Student to a perpetual ticket for the practice of the Hospital, including attendance for one session on the above courses, with the exception of those on practical Pathology and Bacteriology.

An additional special course in the preliminary subjects, viz.:—Anatomy, Physiology, and Optics, for the D.O.M.S. and other Ophthalmology Examinations, will be held twice a year, immediately preceding the date of the examination. The fee for this course is 12 Guineas, or 5 Guineas for any one subject separately.

FEES FOR THE PRACTICE OF THE HOSPITAL:

Perpetual - £5 5 0; Three to Six Months - £3 3 0; Two Months - £2 2 0; One Month - £1 1 0
Clinical work begins at 9 a.m. Operations are performed daily between 10 and 1.

For further particulars apply to Mr. Robert J. Bland, Secretary of the Royal London Ophthalmic Hospital, City Road, E.C. 1, or to the Dean of the Medical School, Mr. M. L. Hepburn.

GORDON HOSPITAL FOR RECTAL DISEASES

VAUXHALL BRIDGE ROAD, LONDON, S.W.1.

FOUNDED 1884.

Chairman—H. SCOTT DENNINGTON, Esq.

27 BEDS.
Bankers—Messrs. Hoare, 37, Fleet Street.

HONORARY MEDICAL STAFF.

Consulting Surgeons.—F. Bowreman Jesset, Esq., F.R.C.S.; Edgar Hughes, Esq., F.R.C.S.
Surgeons.—C. J. Ogle, Esq., M.R.C.S., 1, Cavendish Place, Cavendish Square, W.; W. Ernest Miles, Esq., F.R.C.S., 16, Upper Wimpole Street, W.; Peter I. Daniel, Esq., F.R.C.S., 1A, Upper Wimpole Street, W.; P. Maynard Heath, Esq., M.S., F.R.C.S., 12, Upper Wimpole Street, W.
Assistant Surgeon.—A. L. Abel, Esq., F.R.C.S., 48, Harley Street, W.1.

Anæsthetists.—F. J. Lawson, Esq., M.B., 13, Ovington Gardens, S.W.; Howard Jones, Esq., M.B., 43, Cambridge Street, Hyde Park, W.

Matron.—Miss H. Watson.

Operations Tuesdays and Wednesdays. The practice of the Hospital is free to Medical Men and Students. Out-patients seen at 2 o'clock on Mondays, Wednesdays, Thursdays, and Fridays. All treatment is free. In-patients pay according to their means for maintenance.

A chief feature of the Hospital is to provide for sufferers whose means are unequal to the cost of private treatment, and who yet are not fit subjects for a Free Hospital.

CLEMENT COBBOLD (Barrister at Law), Secretary.

SHROPSHIRE ORTHOPÆDIC HOSPITAL

OSWESTRY.

(Station: GOBOWEN, G.W.R.)

OPEN AIR WARDS.

Private Wards, 5 guineas per week, exclusive of surgeon's fees, but inclusive of X rays, splints, plasters, massage and gymnasium.

A Limited number of beds are available in the General Wards at 2½ guineas per week, inclusive

For particulars apply to the SUPERINTENDENT.

Charing Hospital Medical School

(University of London)

WITH WHICH IS AFFILIATED THE

ROYAL WESTMINSTER OPHTHALMIC HOSPITAL*(adjoining)***OPEN TO MEN AND WOMEN STUDENTS. SESSIONS** commence May and OctoberThe **most central** of all the **Colleges** of the **University**.

Complete Hospital and School arrangements for all departments of Clinical work.

The **INSTITUTE OF PATHOLOGY** includes a series of Laboratories fully equipped for Student, Post-graduate, and Research work.**STUDENTS' CLUB ROOMS** and **RESTAURANT** on the School premises.**A new ATHLETIC GROUND** ($6\frac{1}{2}$ acres) has recently been acquired at Eastcote, and is now in use.**FOUR SCHOLARSHIPS** each of the value of 40 guineas per annum and tenable for three years are awarded annually to students who have completed the Second Medical Examination of Oxford or Cambridge University. Examinations for these Scholarships are held in July each year.**FEES LOW AND INCLUSIVE, NO EXTRAS.***For Prospectus and full information apply personally or by letter to the Dean*

W. J. FENTON, M.D., F.R.C.P.,

Tel. No.: Regent 2508.

Charing Cross Hospital Medical School, London, W.C. 2.

WESTMINSTER HOSPITAL MEDICAL SCHOOL (UNIVERSITY OF LONDON.)

1923-1924. THE TERMS BEGIN ON OCTOBER 1, JANUARY 14, and APRIL 24.**COURSES OF STUDY.**—Full Curriculum for the Preliminary, Intermediate, and Final Examinations of the University of London and of the Conjoint Examining Board of the Royal Colleges of Physicians and Surgeons.**FEES.**—Annual Composition Fee, **35 Guineas**.**ENTRANCE SCHOLARSHIPS.**—The following Scholarships may be competed for during the year:Two, of **£70** each, in Anatomy and Physiology (open) April 18, 19, 1924.Two, of **£70** each, in Anatomy and Physiology (open) Sept. 19, 20, 1924.A certain number of **Scholarships** have been allotted to Universities of England, Wales, and the Colonies, and to Public Schools. These Scholarships are awarded entirely on the nomination of the Principal of the University or School. Any Principal of a University, or Headmaster of a School who wishes to avail himself of this opportunity is asked to communicate with the Dean.

The April Scholarships are open to students entering for the Summer session, and the others to those prepared to enter in October. Those in Anatomy and Physiology are open to students of any University in the United Kingdom or British Dominions. Women Students are admitted.

HOSPITAL APPOINTMENTS.—All Students are provided with Clerkships and Dresser-ships, and are at once eligible, when they have passed the Final Examination for the posts of House Physician, House Surgeon, and Resident Obstetric Assistant with Honorariums. Unvalued opportunities are afforded for holding the appointments.*For further particulars apply to*A. S. WOODWARD, C.M.G., C.B.E., M.D., F.R.C.P., *Dean*,
Medical School, 12 Caxton Street, S.W.1.

THE HOSPITAL FOR SICK CHILDREN,

GREAT ORMOND STREET, W.C. 1.

Clinical Instruction is given daily by Members of the Visiting Staff in the Wards, Out-patient Department, Operating Theatre and Post-mortem Room.

Clinical Clerkships and Dresserships in the Wards and Clinical Assistantships in the Out-patient Department are also available for Students and Post-Graduates, both men and women. Two months of the time spent as Clerks or Dressers by Undergraduate Students is recognized by the Universities of London, Oxford, Cambridge, etc., and by the conjoint Examination Board of England for their final examinations.

Fees for Hospital Attendances: One Month's Ticket, £2 2s. Three Months' Ticket, £5 5s. Perpetual Ticket, £10 10s.

Special Reduced Fee for Clinical Clerks for one month, £1 1s.

Further particulars may be obtained from the Secretary or the Dean.

O. L. ADDISON, F.R.C.S., *Dean to the Medical School.*

WILFRED J. PEARSON, D.M., *Sub-Dean to the Medical School.*

HOSPITAL for CONSUMPTION & DISEASES OF THE CHEST, Brompton and SANATORIUM at FRIMLEY.

Students and qualified men are admitted to the practice of the Hospital and the lectures on payment of a Fee of One Guinea for One Month; Two Guineas for Three Months. Clinical Assistants to the Out-Patients' Department are appointed for Six Months, and are expected to join the practice of the Hospital for that period. A certificate is given to those who have attended a six months' course with satisfaction. The Hospital practice includes out-patient and in-patient clinics. Demonstrations in the Clinical Laboratory, Museum and Special Departments, and Artificial Pneumothorax.

Full particulars can be obtained from - L. S. BURRELL, Dean.

THE ROYAL NATIONAL HOSPITAL

For CONSUMPTION AND DISEASES OF THE CHEST.
VENTNOR, ISLE OF WIGHT.

For the less well-to-do, Open-air Treatment is afforded under the most advantageous conditions at this Institution in the unrivalled climate of the Undercliff of the Isle of Wight. Terms 3 guineas a week.

Form of application may be obtained from the Secretary:

R. N. H. C., 18, Buckingham Street, Strand, W.C. 2.

Ockenden Convalescent Home,

TORQUAY, DEVON. 24 BEDS.

Situated on High Ground overlooking Bay. Balcony, Garden, etc.

CONVALESCENT PATIENTS are received on payment of One Guinea per week, including board and laundry. For particulars, apply—

The Lady Superintendent, MISS GLOVER, Ockenden Home, TORQUAY.

UNIVERSITY OF BIRMINGHAM.

FACULTY OF MEDICINE.

(Associated with the General and Queen's Hospitals for Clinical Teaching.)

The following Hospitals are also associated with the University: THE DEPARTMENT FOR MIDWIFERY AND DISEASES OF WOMEN AT THE DUDLEY-ROAD HOSPITAL (Birmingham Board of Guardians); THE CITY MENTAL HOSPITAL; THE CITY INFECTIOUS DISEASES HOSPITAL; THE BIRMINGHAM AND MIDLAND EYE HOSPITAL; THE ROYAL ORTHOPEDIC AND SPINAL HOSPITAL, Birmingham; THE BIRMINGHAM AND MIDLAND EAR AND THROAT HOSPITAL; THE CHILDREN'S HOSPITAL; THE MATERNITY HOSPITAL OF THE BIRMINGHAM LYING-IN-CHARITY; THE BIRMINGHAM AND MIDLAND HOSPITAL FOR WOMEN.

SCHOOL OF DENTISTRY.

(UNIVERSITY OF BIRMINGHAM AND BIRMINGHAM DENTAL HOSPITAL.)

The Dental Hospital is situated close to the Medical Faculty Buildings of the University and has a large and varied Clinic.

**SUMMER SESSION opens APRIL 29th, 1924, and
the WINTER SESSION on OCTOBER 6th, 1924.**

The University grants Degrees in Medicine, Surgery and Public Health, and a Diploma in Public Health; also Degrees and a Diploma in Dental Surgery. The Courses of Instruction are also adapted to meet the requirements of other Universities and Licensing Bodies.

HOSPITAL APPOINTMENTS.—A large number of Resident hospital appointments in Birmingham and District are open to qualified students of the School.

PRE-MEDICAL COURSES.—The necessary pre-Medical Courses of Instruction in Chemistry, Physics and Biology may be attended in the University.

RESIDENCE FOR UNDERGRADUATES AND OTHER STUDENTS.—There is a Hostel for men students and one for women students. A Register of approved lodgings is also kept by the Secretary of the University.

For Prospectus and further information apply to WILLIAM F. HASLAM, F.R.C.S., Dean.

Royal College of Surgeons in Ireland

SCHOOLS OF SURGERY.

**WINTER SESSION commences in OCTOBER and SUMMER SESSION
in APRIL.**

PROFESSORS.—*Anatomy*—EVELYN J. EVATT. *Physiology and Histology*—J. ALFRED SCOTT. *Surgery*—G. J. JOHNSTON. *Chemistry*—WM. CALDWELL. *Physics*—WM. CALDWELL. *Practice of Medicine*—FRANCIS CARMICHAEL, PURSER. *Materia Medica, Therapeutics, and Pharmacy*—R. J. ROWLETTE. *Midwifery and Gynaecology*—E. HASTINGS TWEEDY. *Forensic Medicine*—J. W. BIGGER. *Biology, Botany, and Zoology*—E. McDOWELL, COSGRAVE. *Ophthalmic and Aural Surgery*—J. B. STORY. *Dentistry*—H. G. SHERLOCK. *Pathology*—WM. BOXWELL.

PRIZES.—The Barker Anatomical Prize, £26 5s. The Carmichael Scholarship, £15. The Mayne Scholarship, £8. The Gold and Silver Medals in Surgery, and the Stoney Memorial Gold Medal in Anatomy.

Class Prizes, accompanied by Silver Medals, will also be given in each subject.

Prospectus and Student's Guide can be obtained on application to

The Registrar, Royal College of Surgeons, Dublin.

**INSURE
AGAINST
FAILURE.**

HENRY W. HILL, B.Sc., Tutor in Chemistry and Physics.

Specialist in RAPID REVISION of Vital Points.

OVER 20 YEARS OF SUCCESS.

Tuition either Orally or by Correspondence.

D.P.H. Meteorology	5 lessons
Matric. (any science subject)	10 lessons
1 Med. or Conjoint (Chem. or Phys.)	10 lessons

NOTE: ADDRESS—Apply by letter for free consultation

94, Addison Gardens, LONDON, W. 14

FOUNDED 1899.

CITY HOSPITAL FOR DISEASES OF THE SKIN AND CANCER

FOUNDED 1899.

3 and 4, HOLLES STREET, and 1, HOLLES PLACE, DUBLIN.

NECESSITIOUS POOR ADMITTED FREE.

HONORARY MEDICAL STAFF.

Consulting Physician.—WILLIAM JOS. DARGAN, M.D., F.R.C.P.I., Phys. to St. Vincent's Hosp.
Consulting Surgeon.—COL. SIR THOS. MYLERS, C.B., F.R.C.S., Ex-President R.C.S.; Surg. to H.M. the King in Ireland; Surg. to Richmond and Whitworth Hosps.
Physician.—C. M. O'BRIEN, M.D., L.R.C.P., Late Acting Clinical Assist., Middlesex Hosp., London; Late Senior Resident Phys., Jervis Street Hosp., Dublin; Hon. Member Dermatological Soc., France; Fellow of the Medical Soc., London; Fellow Royal Academy of Medicine, Ireland.
Asst. Physician.—J. RYAN, M.B., B.Ch., Nat. Univ., D.P.H.
Surgeon.—F. J. MORRIS, M.B., B.Ch., Assist. Surgeon, St. Vincent's Hosp.
Pathologist.—T. T. O'FARRELL, F.R.C.S., Pathologist and Bacteriologist, St. Vincent's Hosp.; First Assist. in Pathology, University Coll., Dublin; Fellow Royal Academy of Med., Ireland.
Matron.—SISTER SUPERIOR.

This Hospital is the first and only one in the City exclusively devoted to the practice and treatment of Skin Diseases, and was the first in Ireland to introduce the Finsen Light in 1900, for the cure of Lupus, while Radium was employed in 1903 in the treatment and cure of Cancer. Senior Students are admitted free to the practice of the Hospital, which has a large out patient attendance, with 50 beds for intern cases.

Classes of instruction in the use of the Finsen Light, Radium, X-Rays, High Frequency Currents, and Ionic Medication, with Demonstrations on Cases already undergoing the treatment, will be held at regular intervals during the Winter and Summer Sessions.

ST. MUNGO'S COLLEGE, GLASGOW.

FACULTY OF MEDICINE.

The commodious Medical Buildings of the College are situated within the grounds of the GLASGOW ROYAL INFIRMARY, and in this Hospital, containing (including the OPHTHALMIC DEPARTMENT) over 600 Medical and Surgical beds, the Clinical and Pathology Classes are conducted.

LECTURES AND DEMONSTRATIONS—Elementary Physics—Prof. ANDREW MARIN, M.A., B.Sc. Chemistry—Prof. ALEG. B. STEPHEN, B.Sc., F.I.C. Botany—Prof. JAMES SWANSON, M.A., M.B. Zoology—Prof. W. D. OSWALD, L.R.C.P.S., L.D.S. Senior Anatomy, Junior Anatomy, Osteology, Practical Anatomy—Prof. JAMES BATTERSBY, F.R.C.S. Eng. Physiology—Prof. ARCH. GALBRAITH FAULDS, M.B., C.M., F.R.F.P.S.G. Surgery—Prof. MILNE MCINTYRE, M.D., F.R.F.P.S.G. Clinical Surgery—The SURGEONS, Royal Infirm. Practice of Medicine—Prof. JOHN HENDERSON, M.D. Clinical Medicine—The PHYSICIANS, Royal Infirm. Midwifery—Prof. BALFOUR MARSHALL. Materia Medica—Prof. T. STEWART BARRIE, M.B. Pathology—PATHOLOGIST to the Royal Infirm. Ophthalmology—Prof. HENRY G. LEASE, M.D., F.R.F.P.S.G. Gynaecology—Prof. BALFOUR MARSHALL. Psychological Medicine—Prof. JAMES H. MACDONALD. Forensic Medicine, Public Health Laboratory—Prof. A. ALLISON.

The fees for all the Lectures, Practical Classes and Hospital attendance necessary for candidates for the Diplomas of the English or Scotch Colleges of Physicians and Surgeons amount to about £120.

A Syllabus of the Medical Curriculum, giving particulars of the classes, fees, etc., may be had gratis on application to the Dean of the Medical Faculty, 86, Castle Street, Glasgow.

ROYAL DENTAL HOSPITAL OF LONDON.

SCHOOL OF DENTAL SURGERY (University of London),
Leicester Square, LONDON, W.C.2.

THIS SCHOOL is thoroughly equipped for Teaching Dental Surgery. The CLINIC of the Hospital is UNRIVALLED.

DENTAL MECHANICS.—Pupils may join in May and October for the two years' Training in Dental Mechanics.

WOMEN are admitted as Students, and are eligible for all appointments and prizes.

For further particulars apply THE DEAN.

HOME OF REST FOR THE AGED SICK AND INFIRM.

FEES MODERATE.

**Principal: THE REST, 299-303, Trinity Road,
 Wandsworth Common, S.W.18.**

Telephone 3014 BATTERSEA.

ROTUNDA HOSPITAL, DUBLIN.

THE HOSPITAL contains 127 beds. Upwards of 2000 maternity cases and 400 gynæcological patients are treated during the year. Besides the Hospital there is an extern Maternity Department with over 2000 cases. The routine for Students consists of attendance at the Morning Lectures on Midwifery and Gynæcology, examination of patients in the Gynæcological Department, attendance at operations and all abnormal labour in the Hospital Wards and conduction of labour cases in the intern and extern departments.

Qualified Students are given facilities for following and observing all abnormal cases in the hospital or district, and are allowed, so far as possible, to assist at Gynæcological operations.

The Hospital Courses are always going on during the year, and Students can join at any time. The Class is limited, therefore it is advisable to register in advance. Board and lodging can be obtained in the Hospital.

Extra classes in gynæcological diagnosis and operative midwifery are conducted by the Assistants to the Master.

Fees, one month, £6 6s.; months other than the first, £4 4s. Three months, £12 12s. L. M. Course, £21.

The L.M. certificate is given on examination after six months intern attendance at the hospital.

Full particulars from GIBBON FIZGIBBON, M.D., Master, Rotunda Hospital.

SCHOOL OF MEDICINE OF THE ROYAL COLLEGES, EDINBURGH. (FOUNDED 1505.)

**WINTER SESSION, 1924-1925,
Opens 7th OCTOBER.**

THE Lectures qualify for the English and Scottish Universities and other Medical Examining Boards.

One half of the Qualifying Classes required for graduation in the University of Edinburgh may be attended in this School.

The School offers a large choice of Teachers upon the various subjects comprised in the Medical Curriculum.

The Calendar of the School, giving all necessary information regarding Classes, Fees, and Examinations, will be published on September 15th; a copy may be obtained (price 6d.) on application to the DEAN OF THE SCHOOL, 11, Bristo Place, Edinburgh.

UNIVERSITY OF BRISTOL.

FACULTY OF MEDICINE.

THE University affords complete courses of instruction for its own examinations, those of the University of London, and those of the Conjoint Board, etc., for Medical Degrees or Diplomas. The Dental and Public Health Departments afford the necessary instruction for the Degrees and Diplomas of the University and of other examining bodies in those subjects.

The University confers the following Degrees and Diplomas :

BACHELOR OF MEDICINE AND BACHELOR OF SURGERY	M.B., Ch.B.
MASTER OF SURGERY	Ch.M.
DOCTOR OF MEDICINE	M.D.
DOCTOR OF PHILOSOPHY	Ph.D.
BACHELOR OF DENTAL SURGERY	B.D.S.
MASTER OF DENTAL SURGERY	M.D.S.
DIPLOMA IN DENTAL SURGERY	L.D.S.
DIPLOMA IN PUBLIC HEALTH	D.P.H.

The early part of the curriculum so interlocks with the curriculum for the B.Sc. that the Medical student may without much loss of time take also the degree of B.Sc. Moreover, the Dental student may in seven years take both Dental and Medical degrees. The whole of the Dental Mechanical work for the Bristol Royal Infirmary and the Bristol General Hospital is done in the University laboratory by the students, instructed by skilled mechanics.

CLINICAL WORK is done at the Bristol Royal Infirmary, and the Bristol General Hospital, which together contain 618 beds. The Bristol Royal Hospital for Sick Children and Women (108 beds), the Bristol Eye Hospital, the Bristol City and County Asylum, and the Bristol City Fever Hospital are also open for the clinical instruction of students.

SCHOLARSHIPS.—There is no entrance scholarship, but students from the City of Bristol may, on their merits, receive financial aid from the City Scholarship Fund on application to the City Scholarship Committee.

Several Scholarships and Prizes are open to students during their Hospital career.

HOSPITAL APPOINTMENTS open to students after qualification

At the Bristol Royal Infirmary.—Two House Surgeons, two House Physicians (of these one is chosen as Senior Resident Officer), one Resident Obstetric Officer, one Throat, Nose and Ear House Surgeon, one Ophthalmic House Surgeon, one Casualty Officer, and one Dental House Surgeon.

At the Bristol General Hospital.—One Senior House Surgeon, one Casualty House Surgeon, two House Physicians, one House Surgeon, and one Dental House Surgeon. All these appointments are salaried, with board and residence.

For further particulars and prospectus apply to the DEAN of the Faculty of Medicine.

UNIVERSITY OF DURHAM

COLLEGE OF MEDICINE, NEWCASTLE-ON-TYNE.

DEGREES IN MEDICINE, SURGERY AND HYGIENE: DIPLOMAS IN PUBLIC HEALTH AND PSYCHIATRY, AND LICENCE IN DENTAL SURGERY.—Seven Degrees, two Diplomas, and one Licence are conferred by the University of Durham—*viz.*, the Degrees of Bachelor of Medicine, Bachelor of Surgery, Doctor of Medicine, Master of Surgery, and Doctor of Surgery; Bachelor of Hygiene, and Doctor of Hygiene; the Diplomas in Public Health and Psychiatry, and the Licence in Dental Surgery. These Degrees, etc., are open to Men and Women.

Attendance at the University of Durham College of Medicine during one of the five years of professional study, or subsequently to qualification elsewhere, is required as part of the curriculum for the Degrees, except in the case of Practitioners of more than fifteen years' standing, who, having attained the age of forty years, can obtain the Degree of M.D. after examination only.

The first three Examinations for the Degrees of M.B. and B.S. may be passed prior to the commencement of attendance at Newcastle.

A candidate who has passed the First and Second Examinations of the University will be exempt from the First and Second Examinations of the Conjoint Board in England, and will be entitled to present himself for the Final Examination of the Board on the completion of the necessary curriculum.

Students can complete, at the University of Durham College of Medicine, Newcastle-upon-Tyne, the entire course of professional study required for the above degrees, and for the Diplomas in Public Health and Psychiatry; also for the examinations of the Royal Colleges of Physicians and Surgeons, and for the Army and Navy Examination Boards.

A Dental curriculum is provided, and a Licence in Dental Surgery may be obtained after Examination.

All information is given in the Calendar of the University, which may be obtained from the Registrar at the College, price 3/6, per post 4/-.

Scholarships, &c.—University of Durham Scholarship, value £100 for proficiency in Arts, awarded annually to full students in their first year only. The Peas Scholarship—value £150—for proficiency in Arts. Dickinson Scholarship—value the interest of £400, and a Gold Medal—for Medicine, Surgery, Midwifery, and Pathology. Tulloch Scholarship—value the interest of £400—for Anatomy, Biology, Chemistry, and Physics. Charlton Scholarship—value the interest of £700—for Medicine. Gibb Scholarship—value the interest of £500—for Pathology. Luke Armstrong Scholarship—interest on £680—for comparative Pathology. Stephen Scott Scholarship—interest on £1000—for Surgery. Heath Scholarship—the interest on £400 for Surgery, to be awarded every second year. Philipson Scholarships (2)—interest of £1800, to be awarded in connection with the Final M.B., B.S. Examinations in March and June. Gibson Prize—value the interest of £250 Stock—for Midwifery and Diseases of Women and Children. The Turnbull Prize and Medal—for Surface Anatomy. The Outerson Wood Prize—value the interest of £250—for Psychological Medicine. The Goyder Memorial Scholarship (at the Infirmary)—value the interest of £325—for Clinical Medicine and Clinical Surgery. At the end of each Session, a Prize of Books is awarded in each of the regular Classes. Assistant Demonstrators of Anatomy, Prosectors, and Assistant Physiologists are elected yearly. Pathological Assistants, Assistants to the Dental Surgeon, Assistants in the Eye Department, Clinical Clerks and Dressers are appointed every three months.

The Royal Victoria Infirmary contains 500 beds. Clinical Lectures are delivered by the Physicians and Surgeons in rotation. Pathological Demonstrations are given as opportunity offers, by the Pathologist; Practical Midwifery can be studied at the Newcastle Maternity Hospital, where there is an outdoor practice of over 1000 cases annually.

F E E S .

- (a) A Composition Ticket for Lectures at the College may be obtained—
 - I.—By payment of £122 on entrance.
 - II.—By payment of £22 at the commencement of the First Year, and £54 at the commencement of the Second Year.
 - III.—By three annual instalments of £61 10s., £47 10s., and £41 respectively, at the commencement of the Sessional year.
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For 3 Months' Medical and Surgical Practice, £12 12s. For 6 months', £15 15s. For 1 year's, £21. For Perpetual, £46; or by two instalments—First year, £23; Second year, £23.

In addition to the above fees, the Committee of the Royal Victoria Infirmary require the payment of 3 guineas yearly up to three years from every student attending the Infirmary. For six months, or any shorter period, this fee is 1 guinea. After three years of attendance, such payment will be no longer necessary.
 - (c) Single courses of Lectures, £6 16s. 6d.
 - (d) A Composition Ticket for the courses of Lectures and Practical work of the first two years of the curriculum, may be obtained by the payment of £68 on entrance.
 - (e) Composition fee for Lectures, etc., at College for Licence in Dental Surgery, £57 10s. Composition fee for Practical work at Dental Hospital, £60 4s. if paid in one sum; or £32 6s. if paid in two instalments.
 - (f) Composition fee for courses of instruction for the Diploma in Psychiatry, £33.
- Fees for Lectures, etc., at the College and for Hospital Practice, must be paid to the Registrar; and fees for Practical Dental Work to the Dean of the Dental Hospital—at the time of entry.
- Further particulars may be obtained from the Registrar, PROF HOWDEN, at the College.

UNIVERSITY OF EDINBURGH

SESSION 1923-24.

Principal—Sir J. ALFRED EWING, K.C.B., M.A., D.Sc., LL.D., F.R.S.

The WINTER SESSION, 1923-24, opens on 9th October, and closes on 14th March.

The SUMMER SESSION, 1924, opens on 29th April, and closes on 11th July.

FACULTY OF MEDICINE.

Dean—PROFESSOR J. LORRAIN SMITH, M.A., M.D., LL.D., F.R.S.

The Faculty embraces 19 Chairs and 65 Lectureships; and attached to these Chairs there are about 40 Assistants and Demonstrators. Instruction is given in all the main branches of Medical Science, viz

PROFESSORS:

Chemistry—George Barger, D.Sc., F.R.S.
Zoology—J. Cossar Ewart, M.D., F.R.S.; J. H. Ashworth, D.Sc., F.R.S.
Botany—Wm. Wright Smith, M.A., F.R.S.
Anatomy—Arthur Robison, M.D.
Physiology—Sir E. S. Schafer, LL.D., F.R.S.
Materia Medica—A. R. Cushny, M.D., LL.D., F.R.S.
Pathology—J. Lorrain Smith, M.D., LL.D.
Bacteriology—Thomas Jones Mackie, M.D.
Forensic Medicine—Harvey Littlejohn, M.B., B.Sc.

UNIVERSITY

Clinical Surgery—Alexander Miles, M.D., C.M.; J. W. Dowden, M.B., C.M.; A. A. Scott Skirving, C.M.G., M.B., C.M.; G. L. Chene, M.B., C.M., W. J. Stuart, M.B., Ch.B.
Clinical Medicine—R. A. Fleming, M.D.; D. Chalmers Watson, M.D.; Edwin Matthew, M.D.; W. R. Ritchie, M.D.; John Eason, M.D.
Clinical Gynaecology—B. P. Watson, M.D.; J. Haig Ferguson, M.D.; William Foidyce, M.D.
Diseases of the Eye—J. V. Paterson, M.B., C.M.; A. H. H. Sinclair, M.D.
Clinical Instruction in Diseases of Children—J. Stewart Fowler, M.D.; John Fraser, M.D.; Charles McNeil, M.D.; N. S. Carmichael, M.B., Ch.B.
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Experimental Physiology—Lancelot Hogben, M.A., D.Sc.
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Experimental Pharmacology—W. C. Sillar, M.D., B.Sc.

Public Health—C. Hunter Stewart, M.B., D.Sc.
Medicine—Geo. Lovell Gulland, C.M.G., M.D.
Surgery—
Midwifery and Gynaecology—Benjamin P. Watson, M.D.
Clinical Surgery—Sir H. J. Stiles, K.B.E., M.B., M.Ch.
Clinical Medicine—Edwin Brainwell, M.D.; Geo. Lovell Gulland, C.M.G., M.D.; J. C. Meakins, M.D.
Tuberculosis—Sir Robert W. Philip, M.D.
Therapeutics—J. C. Meakins, M.D.
Psychiatry—George M. Robertson, M.D.

LECTURERS:

Pathology, Practical—F. E. Reynolds, M.B.
Morbid Anatomy—W. A. Alexander, M.D.
Physics—G. A. Carse, M.A., D.Sc.
Diseases of the Larynx, Ear and Nose—A. Logan Turner, M.D.; John S. Fraser, M.B.; John D. Littlejohn, M.B.
Tropical Diseases—D. G. Marshall (Lt.-Col., I.M.S.)
Med. Entomology and Parasitology—J. H. Ashworth, D.Sc., F.R.S.; W. S. Patton (Major, I.M.S.)
Tropical Hygiene—J. B. Young, M.B., D.Sc. (conjointly with Professor).
Diseases of the Skin—Sir Norman Walker, M.D.; Frederick Gardner, M.D.
Clinical Instruction in Infectious Fevers—Alexander James, M.D.; Claude B. Ker, M.D.
History of Medicine—J. D. Comrie, M.A., B.Sc., M.D.
Neurology—
Surgical Pathology—J. M. Graham, M.B., Ch.M.
Practical Anaesthetics—J. Stuart Ross, M.B., Ch.B. (Demonstrator).
Veneral Diseases—David Lees, D.S.O., M.B.
Psychology—J. Drever, M.A., B.Sc., D.Phil.

Practical Instruction is afforded, under the superintendence of the Professors, in Laboratories with the necessary appliances, and in Tutorial and Practical Classes connected with the above Chairs, and opportunities are afforded to Students to extend their practical knowledge and engage in original research. Opportunities for Hospital Practice are afforded at the Royal Infirmary, the Hospital for Sick Children, Maternity Hospital, the City Fever Hospital, and the Asylum for the Insane. Upwards of 2760 beds are available for the Clinical Instruction of Students of the University. Four Degrees in Medicine and Surgery are conferred by the Univ. of Edinburgh, viz.: Bachelor of Med. (M.B.), Bachelor of Surg. (Ch.B.), Doctor of Med. (M.D.), and Master of Surg. (Ch.M.). The minimum Class Fees for M.B. and Ch.B., including Hospital Fee (£12), amount to about £200, and the Matric. and Exam. Fees to £15. An additional Fee of £21 is payable by those who proceed to M.D., and £21 by those who proceed to Ch.M. The annual value of the Bursaries, Prizes, Scholarships, and Fellowships in the Faculty of Med. amounts to about £3,600, and that of the other Bursaries, etc., tenable by Students of Med., amounts to about £1,820.

POST-GRADUATE INSTRUCTION.—Courses of instruction are given for the Degrees of B.Sc. and D.Sc. in Public Health and for the University Diplomas in Public Health, Tropical Medicine and Hygiene, and Psychiatry. These Diplomas are open to approved registered practitioners as well as to graduates in Medicine and Surgery of the University.

The University also takes part in the Courses given under the auspices of the Edinburgh Post-Graduate Courses in Medicine. In the departments of the Faculty of Medicine, provision is made for research by students of graduate standing.

In the University Laboratories facilities will be provided for candidates for the Degree of Ph.D. whose applications to engage in research have been accepted by the Senatus.

A Syllabus and further information as to Matriculation, the Curricula of Study for Degrees, etc., may be obtained from the Dean of the Faculty of Medicine, and for Degrees in the Faculties of Arts, Science, Divinity, Law, and Music, from the Deans of these Faculties; or from the Secretary, and full details are given in the University Calendar, published by James Thin & Co., South Bridge, Edinburgh. Price by post, 6s. By Authority of the Senatus,
 October, 1923. WILLIAM WILSON, Secretary.

... THE ...

UNIVERSITY OF LIVERPOOL

FACULTY OF MEDICINE.

The University grants degrees in Medicine, Surgery, Hygiene, Orthopaedic Surgery, Dental Surgery, and Veterinary Science, also degree of Doctor of Philosophy, and Diplomas in Public Health, Tropical Medicine, Veterinary Hygiene, Medical Radiology and Electrology, and a Licence in Dental Surgery.

Students may also prepare in the University for the examinations of other licensing bodies.

Medical School Buildings.—The buildings of the Medical School are all modern, and contain spacious lecture rooms, and well-equipped laboratories and class-rooms for the study of all the more important subjects which form the basis of medicine. In addition, laboratories are provided for medical research in Bio-chemistry, Tropical Medicine, Physiology, Pathology, Bacteriology, and Hygiene.

Hospitals.—The Clinical School consists of four general hospitals—the Royal Infirmary, the David Lewis Northern Hospital, the Royal Southern Hospital, and the Stanley Hospital; and of six special hospitals: the Eye and Ear Infirmary, the Hospital for Women, the Royal Liverpool Children's Hospital, St. Paul's Eye Hospital, St. George's Hospital for Skin Diseases, and Liverpool Maternity Hospital. These hospitals contain in all a total of over 1140 beds.

Fellowships and Scholarships.—Fellowships, Scholarships, and prizes of over £1000 are awarded annually. There are also numerous Entrance Scholarships. Particulars may be obtained on application.

The following Prospectuses may be obtained on application to the Registrar:—Medical Faculty, School of Tropical Medicine, School of Dental Surgery, School of Veterinary Science, and Diploma in Public Health.

WALTER J. DILLING, M.B., Ch B.

UNIVERSITY of ABERDEEN

Founded 1494.

FACULTY OF MEDICINE.

THE Degrees in medicine granted by the University are—Bachelor of Medicine, Bachelor of Surgery, Doctor of Medicine, and Master of Surgery. The Degree of Ph.D. is also granted in this Faculty. They are conferred after Examination, and only on Students of the University. Women are admitted to instruction and graduation on the same footing as men. A Diploma in Public Health is conferred (after Examination) on Graduates in Medicine of the University of Aberdeen, or of any University whose medical degrees are recognized as qualifying for registration by the General Medical Council of the United Kingdom. The Faculty of Medicine embraces twelve chairs, and instruction is given in all departments of Medical Science.

Practical Classes are conducted by the Professors, Readers, Lecturers, and Assistants in Laboratories furnished with all necessary appliances; and facilities are afforded to Students and Graduates to extend their practical knowledge and to engage in original research.

Instruction is also given in special departments of Medical Practice by Readers and Lecturers appointed by the University Court.

Clinical instruction is obtained in the Royal Infirmary, the Royal Hospital for Sick Children, the City (Fever) Hospital, the General Dispensary, Maternity Hospital, Vaccine Institutions, Ophthalmic Institutions, and the Royal Mental Hospital.

Bursaries, Scholarships, Fellowships and Prizes, to the number of 50 and of the Annual Value of £1193, may be held by Students in this Faculty.

The cost of Matriculation, Class and Hospital Fees for the whole curriculum, inclusive of the fees for the Degrees, is approximately £236.

A Prospectus of the Classes, Fees, &c., may be had on application to the Secretary, and full particulars will be found in the University Calendar published by the Aberdeen University Press Ltd.

H. J. BUTCHART, Secretary.

Royal College of Surgeons of Edinburgh

(INCORPORATED 1505.)

Copies of the Regulations for the Fellowship, Licence, and Licence in Dental Surgery, with dates of Examinations, Curricula, etc., for the year 1924, are now ready, and may be had on application to—

D. L. EADIE, 49 LAURISTON PLACE, EDINBURGH, *Clerk of the College.*

Medical and Dental Students must state date of Registration.

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This Hospital is fully equipped for instruction in infectious diseases. It is recognized by the Universities of London, Cambridge, and Oxford, the Royal Colleges of Physicians and Surgeons, etc.

CLASSES FOR MEDICAL STUDENTS are held on Tuesdays and Fridays throughout the year, except in August and September. There is a morning class at 10.45 and an afternoon class at 2.15. Fee for a two months' course, three guineas; for a three months' course, four guineas. In the event of there being smallpox cases at Dagenham Hospital during the Students' course, instruction in that disease will be included: qualified men can attend this course. Special arrangements made for D.P.H. students.

Enquiries and applications to join above Courses should be addressed to Dr. MacIntyre, Medical Superintendent, Plaistow Hospital, E. 13. The Superintendent can also be seen at the Hospital on week-days at 2 P.M.

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- By improving the training and status of masseuses and masseurs.
- By providing and supervising independent examinations.
- By setting up Registers of persons qualified to practise.
- By arranging post-graduate courses, lectures, and conferences.
- By supplying work for members (under Registry regulations) and
- By working in all ways for the advancement and general welfare of the profession.

Registration with the Chartered Society is open to all certificated masseuses and masseurs who fulfil requirements, particulars of which can be obtained on application. The Register contains 5000 names and addresses of members engaged in private practice or holding appointments under the Admiralty, War Office, Ministry of Pensions, Red Cross Society, or in Hospitals and Institutions. Treatments are carried out under Medical direction only, and members may not advertise except in recognised medical and nursing papers.

All inquiries for Masseuses and Masseurs in London and the Provinces will receive prompt attention on application to the Secretary, C.S.M.M.G. 157, Great Portland Street, W.1. Telephone: Langham, 1893.

Medical Defence Union,

INCORPORATED 1885.

LIMITED.

Registered
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General Secretary: JAMES NEAL, M.R.C.S., L.R.C.P.

THE OBJECTS OF THE UNION ARE AS FOLLOWS:

- I.—To support and protect the character and interests of Medical Practitioners practising in the United Kingdom.
- II.—To promote honourable practice, and to suppress or prosecute unauthorized practitioners.
- III.—To **ADVISE and DEFEND** or assist in defending Members of the Union in cases where proceedings involving questions of professional principle or otherwise are brought against them.

TERMS OF MEMBERSHIP.—The Annual **SUBSCRIPTION** is **£1**, payable on JANUARY 1ST OF EACH YEAR, with an **entrance fee of 10s.** payable on joining the Union. The Member has also to guarantee a certain sum (not less than £1) which forms the extent of his liability. Newly registered medical practitioners are admitted to membership without payment of an Entrance Fee, provided they join the Union within one year of the date of their Registration. A Member elected on or after 1st July in any year is only required to pay half the current subscription for that year. The privileges of a Member are personal to himself.

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Application Forms, Copies of last Report, and any other information can be obtained by applying to the Secretary at the Registered Offices.

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Telephone:
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SIR JOHN TWEEDY, LL.D., F.R.C.S.

PRINCIPAL OBJECTS.

To protect, support, and safeguard the character and interests of legally qualified Medical and Dental Practitioners; to advise and assist Members of the Society in matters affecting their professional character and interests; and to indemnify them in regard to actions, etc., undertaken on their behalf.

INDEMNITY AGAINST DAMAGES.

Members of the London and Counties Medical Protection Society are not only indemnified against the cost of defending or conducting actions undertaken on their behalf by the Society, whether as plaintiffs or defendants, but are also, subject to the provisions of the Articles of Association, indemnified, up to £3,000 in any one year for any one member, against the damages and costs of the other side which may be awarded against them in cases which the Society has defended or conducted on their behalf, but in which it has not been successful.

Provision has been made for the latter purpose of an available sum of £24,000 per annum.

Entrance Fee, 10/-. Subscription, £1 per annum.

The Subscription covers 12 months on whatever day a member may be elected. No entrance fee is payable by candidates applying for election as members within a year of registration.

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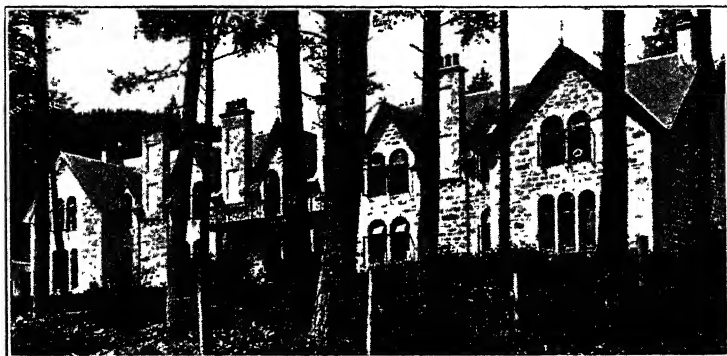
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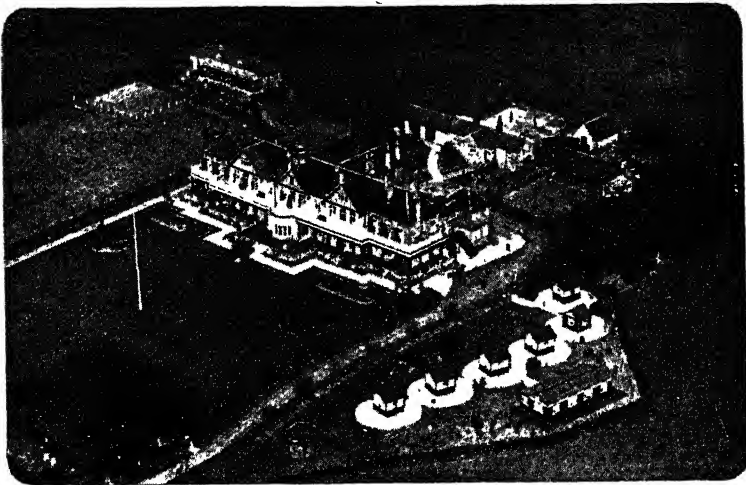
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£50 will support a child for a year.

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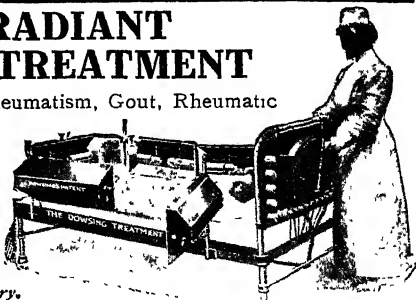
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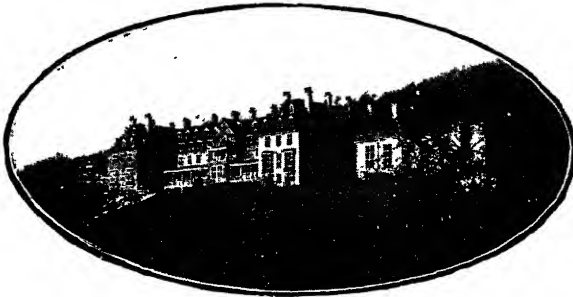
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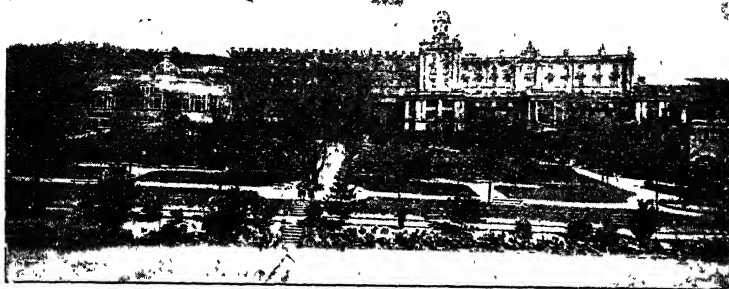
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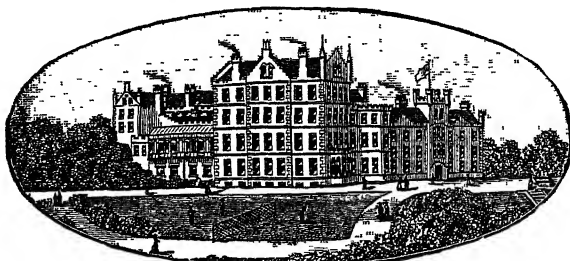
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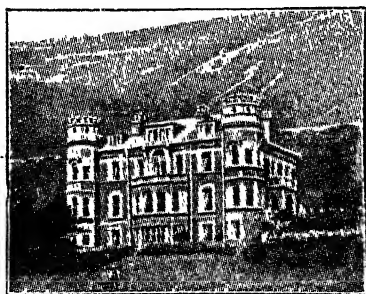
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In connection with this Hospital, there is a **CONVALESCENT HOME** on the Surrey Hills at **WITLEY**,

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HOSPITAL FOR NERVOUS DISEASES.

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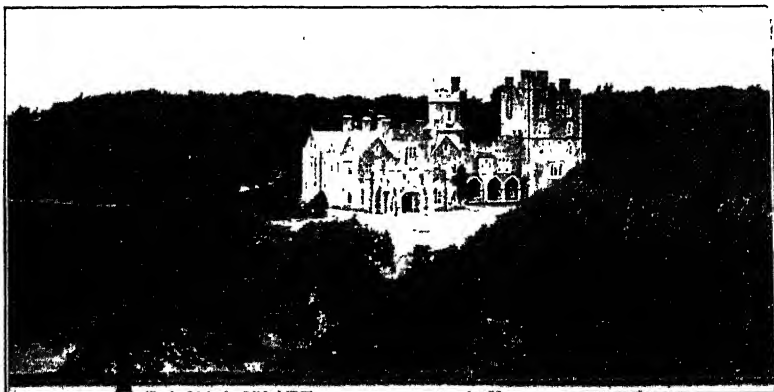
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SITUATED amongst charming scenery, more than 600 feet above the sea, large grounds, pure water, perfect sanitation, and enjoying the bracing air of the "English Highlands."

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For the Cure and Care of Patients of the Upper Class suffering from
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**These Hospitals are built on the Villa System, and there are also
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Voluntary Patients admitted without Medical Certificates.

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Telephone : Dublin No. 1224. On Mondays, Wednesdays, and Fridays, at 2.30 p.m.

CORPORATION MENTAL HOSPITAL, PORTSMOUTH.

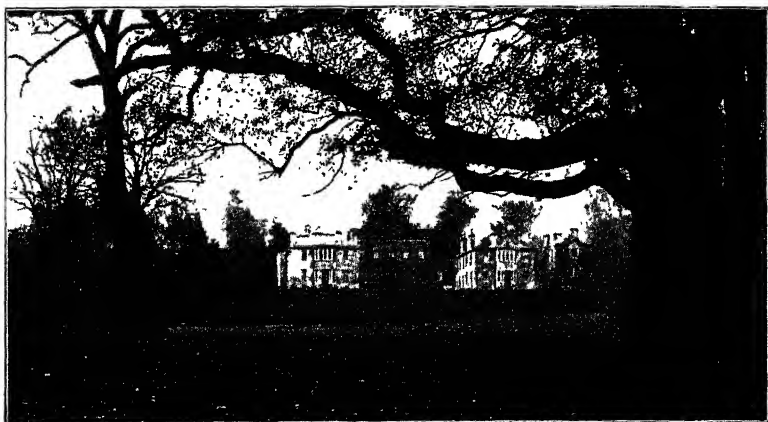
Accommodation is provided for Ladies and Gentlemen in Two
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THIS Institution for the reception of **PRIVATE PATIENTS** of both sexes of the **Upper and Middle Classes** only, at moderate rates of payment, is beautifully situated in its own grounds about two miles from Nottingham, and from its singularly healthy and pleasant position, and the comfort of its internal arrangements, affords every facility for the **Relief and Cure of those Mentally Afflicted.** Divine Service is held in the Institution every Sunday by the Chaplain, who also visits the Patients. Carriage and motor exercise is provided.

— FOR TERMS, ETC., APPLY TO —

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VIRGINIA WATER.

*A Registered Hospital for the CURE and CARE
of the INSANE and of NERVOUS INVALIDS
— of the MIDDLE and UPPER CLASSES. —*

THIS Institution is situated in a beautiful and healthy locality, within easy reach of London. It is fitted with every comfort. Patients can have Private Rooms and Special Attendants, as well as the use of General Sitting Rooms, at moderate rates of payment. Voluntary Boarders not under Certificates can be admitted.

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St. Ann's Heath, Virginia Water, SURREY.*

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THIS PRIVATE ASYLUM, which was founded by the late W. H. O. SANKEY, M.D., F.R.C.P., for the reception of a limited number of

LADIES & GENTLEMEN MENTALLY AFFLICTED,

— is now conducted by his son, —
E. H. O. SANKEY, M.A., M.B., B.C. Cantab.

The Ladies' Division is directly supervised by Mrs SANKEY.

The Mansion stands high, among handsomely laid out gardens in the midst of a picturesque deer park (about 40 head of deer are kept), and commands a magnificent view of Welsh mountain scenery.

Carriages, horses, motor, lawn-tennis, golf, trout and other fishing are provided.

Arrangements can be made to enable friends of patients to reside in the House as Boarders if so desired.

The Asylum is situate about ten miles from Shrewsbury, within easy distance of Baschurch Station, G.W.R., whither carriages can be sent at any time for visitors.

Letters and Telegrams should be addressed to—

Dr. SANKEY, Boreatton Park, Baschurch, SALOP.

THE WARNEFORD

HEADINGTON HILL, OXFORD.

**A Registered Hospital for the Care & Treatment of
both Sexes of the Upper and Middle Classes, when
suffering from Nervous and Mental Disorders. . .**

President—THE RIGHT HON. THE EARL OF JERSEY.

Chairman of the Committee—REV. WM. ARCHIBALD SPOONER, D.D.,
Warden of New College, Oxford.

Vice-Chairman—

J. BARON MOYLE, Esq., D.C.L.

THIS HOSPITAL is pleasantly situated on Headington Hill, on the outskirts of the City of Oxford. The grounds, which extend to over 70 acres, command extensive views of the surrounding country.

The buildings are arranged, so far as is compatible with the requirements of a Mental Hospital, in the manner of an ordinary private residence.

VOLUNTARY BOARDERS ARE RECEIVED.

For terms and further particulars, apply to the—

Physician Superintendent, ALEX. W. NEILL, M.D.

CHEADLE ROYAL,

CHEADLE, CHESHIRE.

THIS Registered Hospital for **MENTAL DISEASES**
with its Seaside Branch GLAN-Y-DON, COLWYN
BAY, is for the **TREATMENT** of **PRIVATE**
PATIENTS of the **UPPER** and **MIDDLE**
CLASSES. :: Voluntary Boarders received.

For Terms, etc., apply to the **SUPERINTENDENT - J. A. C. ROY, M.B.**,
or he may be seen at 72, BRIDGE STREET, MANCHESTER, on Tuesdays and
Fridays, from 2.0 to 3.0.

Telephone : 163 Gatley.

The Lawn, Lincoln.

A REGISTERED HOSPITAL for MENTAL DISEASES,
situated in the City of Lincoln, near to the Cathedral.

FOR TERMS, APPLY TO—

DR. RUSSELL, Resident Medical Superintendent.

Brislington House,

Near BRISTOL.

**Established
1804.**

A PRIVATE MENTAL HOSPITAL for the care and treatment of persons of the upper and middle classes of both sexes.

The House is situated on an estate of 200 acres and has extensive pleasure grounds and a Farm connected with it. It lies between Bristol and Bath, 3 miles from Bristol Station, and within 2½ hours' journey from London.

In addition to the main building there are several villas, completely detached and pleasantly situated in their own grounds, where there is accommodation for suitable cases. Patients can be received without certificates as Voluntary Boarders.

For terms and further particulars apply to
THE MEDICAL SUPERINTENDENT.

Telegrams: "Fox, Brislington."

Telephone: No. 2 Brislington.

For the Treatment of Mental Diseases.

Shaftesbury House, **FORMBY-BY-THE-SEA.**

Telephone: No. 8 FORMBY.

Near LIVERPOOL.

THIS HOUSE, specially built and licensed for the **Care and Treatment of a limited number of Ladies and Gentlemen MENTALLY AFFLICTED**, is delightfully situated near the coast between Liverpool and Southport, so that patients have the benefit of pure bracing sea air, for which Formby is noted. The House is in the country, and stands in several acres of ornamental well-wooded grounds, the surroundings being in every way bright, cheerful and pleasant. All kinds of outdoor and indoor amusements and occupation provided. Voluntary Boarders without certificates admitted.

TERMS MODERATE—Apply DR. STANLEY GILL, Medical Superintendent.

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PRIVATE Mental Patients of both sexes are received in connection with the Worcestershire Mental Hospital. Extensive private grounds in the beautiful Lickey District.

Terms, 35s. WEEKLY.

For further particulars and necessary forms apply to the Medical Superintendent.

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Telephone: No. 2 Box.

LICENSED FOR THE TREATMENT OF DISEASES
OF THE BRAIN AND NERVOUS SYSTEM.

THIS House is situate 450 feet above sea level, and commands extensive views of the surrounding country.

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Dr. H. C. MacBRYAN or Dr. J. V. BLACHFORD, C.B.E.
at the above,

Or at 17, BELMONT, BATH. - - *Telephone: No 636, Bath.*

ST. PATRICK'S INSTITUTE BELMONT PARK, WATERFORD.

*Private Mental Hospital for the Treatment
and Cure of Mentally Afflicted Gentlemen.*

CONDUCTED BY THE BROTHERS OF CHARITY.

THIS beautiful residence is admirably adapted to its present purpose. It is erected on an eminence overlooking the City and Harbour of Waterford, and is surrounded with scenery of the most varied character. The views from the House and grounds extend over miles of picturesque country. From its singularly healthy and pleasant position and the comforts of its internal arrangements, it affords every facility for the relief and cure of those mentally afflicted.

The pleasure grounds, which are very spacious, have been laid out in the most tasteful manner for the recreation of the patients. They have also the privilege of long country walks, car drives, motoring, and seaside excursions.

Terms will be found more moderate than those of any other Institution of its kind in the Country.

Apply to THE REV. SUPERIOR.

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A REGISTERED MENTAL HOSPITAL
for the Treatment and Care of Nervous and
Mental Invalids of the Upper & Middle Classes.

For Particulars apply to the Medical Superintendent:—

GEORGE RUTHERFORD JEFFREY, M.D. Glasg., F.R.C.P.E., F.R.S.E.

BETHEL HOSPITAL

FOR MENTAL DISEASES, NORWICH.

ESTABLISHED A.D. 1713.

THIS Institution is a Registered Hospital, managed by a Board of Governors who have no pecuniary interest in its success, but whose sole object is to promote the comfort and well-being of the Patients. The Hospital is arranged for both sexes.

Voluntary Boarders are admitted without certificates.

CONSULTING PHYSICIAN:

SAMUEL J. BARTON, M.D.

RESIDENT MEDICAL SUPERINTENDENT:

SAVILLE J. FIELDING, M.B.

CLERK TO THE GOVERNORS:

B. F. HORNOR, QUEEN STREET, NORWICH.

MATRON:

Miss OXLEY.

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Resident Medical Superintendent, BETHEL HOSPITAL, NORWICH.

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A Commodious Country House, situated in bracing hilly country, 10 miles from Manchester.

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CARE & CURE OF MENTAL INVALIDS (Ladies).

Resident Physician: G. E. MOULD, M.R.C.S. Eng., L.R.C.P. Lond.,
Physician for Mental Diseases to the Sheffield Royal Hospital.

THE House is a spacious Family Mansion, with extensive pleasure grounds, including good Croquet and Tennis Grounds, and an immense Park, containing Private Drives and Walks of several miles in extent. It is situated in the heart of the famous Robin Hood Country (5 miles from Sheffield, 4 from Rotherham) and is surrounded by beautiful scenery, and an atmosphere free from smoke and impurity. Situation dry and healthy. The arrangements are of a domestic character. The Proprietors welcome visits from the usual Medical Attendant of the Patient during her residence. Under the New Act Voluntary Patients can be received, without Certificates, on own personal application. The Rev. R. T. C. Slade, Mus. Bac, late Vicar of Thorpe-Hesley, acts as Chaplain, and conducts regular Services.

The Resident Physician may be seen at the Grange; or at 342 Glossop Road, Sheffield, by appointment. Telephone. No. 34 Rotherham.

GRANGE LANE STATION (L. & N.E. Railway) is within a quarter of a mile of the Grange, and may be reached via Sheffield or Barnsley direct; or via Rotherham changing at Tinsley.

FOR TERMS, FORMS, &c., APPLY TO THE RESIDENT PHYSICIAN.

THE RETREAT, YORK.

A Registered Hospital for the Treatment of MENTAL DISEASES.

ESTABLISHED 1792.

Telephone: 112 York.

Under the management of a Committee of Members of the Society of Friends. Situated about 1½ miles from York Station. The Patients are derived from the **Upper and Middle Classes**, and none are paupers or rate-aided. **Terms from £6 6s. weekly.**

Voluntary Boarders are received on their own application.

For further particulars see the Annual Report, which will be sent on application to **Dr. HENRY YELLOWLEES, the Medical Superintendent.**

RETREAT TRAINED NURSES DEPARTMENT.

Staffed by Nurses who have been trained for four years in the Retreat, and conducted upon a profit-sharing basis. MENTAL & NERVOUS CASES only undertaken.

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Ladies & Gentlemen suffering from
:: Nervous or Mental Breakdown.

Special Attention is given to the Curative Treatment of Early Cases.

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Telephone: 49 BATH.

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Trams to Bathford pass the entrance gates of Bailbrook House.

Terms Inclusive, from 5 Guineas per week.

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NEAR BEDFORD.

(TELEPHONE No. 17.)

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ORDINARY TERMS: FIVE GUINEAS WEEKLY.

Physicians { DAVID BOWER.
CEDRIC W. BOWER.

Incorporated by



Royal Charter.

JAMES MURRAY'S ROYAL MENTAL HOSPITAL,
Chairman—The Rt. Hon. The Earl of Mansfield. **PERTH.**

THIS Mental Hospital is healthily situated, amidst picturesque surroundings, on the Hill of Kinnoull in the immediate vicinity of Perth. It stands in the midst of extensive Pleasure Grounds, surrounded by the fields of the Home Farm, and commands unrivalled views extending over the valley of the Tay to the range of the Grampians. The central position of Perth and the efficient railway service make it easily accessible from all parts.

The beautifully situated mansion-house of **Pitcullen**, adjoining but distinctly separated from the Asylum, is in use as a Convalescent home, and also for Patients afflicted with the milder forms of mental disorder. In addition to this, there are detached **Villas** for those Ladies and Gentlemen who pay the higher boards.

Seven Gables, Elie, the seaside house, is arranged as a Holiday Home for the reception of those suffering from mild mental disturbance, and convalescents.

The Institution receives no rate-paid patients. The entire arrangements are of a domestic character, and there are ample means of occupation and amusement.

The Rates of Board vary, according to the requirements and circumstances of each case, from £90 to £500 and upwards, per annum.

Postal and Telegraphic Address: DR. CHAMBERS, Perth.

Telephone: Perth 104.

ASHWOOD HOUSE,

KINGSWINFORD, STAFFORDSHIRE.

An old-established and modernized Institution for the Medical Treatment of Ladies and Gentlemen Mentally Afflicted.

THE House, pleasantly situated, stands in picturesque grounds of forty acres in extent, with a surrounding country noted for the beauty of its walks and drives. The climate is genial and bracing. Occupation, indoor and outdoor amusements, and carriage and other exercise amply provided.

TERMS vary according to requirements as to accommodation, special attendance, etc.

TELEPHONE : 19, KINGSWINFORD.

Railway Stations: Stourbridge Junction (G.W.R.), $3\frac{1}{2}$ miles; Dudley (L. & N.W.R.), 4 miles; Wolverhampton (G.W.R. or L. & N.W.R.), 7 miles.

FOR FURTHER PARTICULARS APPLY TO THE MEDICAL SUPERINTENDENT.

NORTHWOODS HOUSE,

WINTERBOURNE, near BRISTOL.

A Sanatorium for Ladies and Gentlemen suffering from Nervous and Mental Disorders.

SITUATED in a large Park, 300 feet above sea level, in a healthy and picturesque locality, easily accessible from London, Bristol, and Cardiff by Winterbourne Station; or from Fishponds, Yate, or Patchway Stations.

Voluntary Boarders received without Certificates.

For further information, see London Medical Directory, p. 2177, and for Terms, etc., apply to Resident Proprietors and Licensees:—

DR. J. D. THOMAS and DR. J. R. P. PHILLIPS, NORTHWOODS HOUSE.

TELEPHONE - No. 18 WINTERBOURNE.

Bucks Mental Hospital

THE COMMITTEE OF VISITORS are prepared to receive

PRIVATE PATIENTS on Moderate Terms.

Separate accommodation is provided for Private Patients on the Male and Female sides of the Institution. The Hospital is situated in the Country, three miles from Aylesbury Station, and about forty miles from London.

For further particulars apply to the MEDICAL SUPERINTENDENT—

DR. H. KERR, STONE, AYLESBURY.

BARNWOOD HOUSE, GLOUCESTER.

A REGISTERED HOSPITAL for MENTAL DISEASES, for PRIVATE PATIENTS Only, of the UPPER and MIDDLE CLASSES.

ARRANGED and furnished with all the most approved appliances for the treatment, comfort and amusement of the Inmates. Within two miles of the Railway Station, and easily accessible by Rail from London and all parts of the Kingdom. It is beautifully situated at the foot of the Cotswold Hills, and stands in its own grounds of 250 acres. Voluntary Boarders not under certificates are admitted. The MANOR HOUSE for Ladies only, which is entirely separate from the Hospital and standing in its own grounds, is being utilized exclusively for voluntary patients.

For Terms, etc., apply to ARTHUR TOWNSEND, M.D.,
Telephone: No. 7 BARNWOOD. *Resident Superintendent.*

PLYMPTON HOUSE, PLYMPTON, SOUTH DEVON. ESTABLISHED 1834.

PLYMPTON HOUSE is licensed for the accommodation of both sexes, and is well adapted by its position and appointments for the Medical Treatment and Care of Patients of the Upper and Middle Classes, suffering from MENTAL DISEASE.

The Proprietors, Dr. ALFRED TURNER and Dr. J. C. NIXON, have had very large experience of Mental cases, both in public and private institutions, and everything that can be done to ameliorate the condition of the chronic, and promote the cure of the acute cases—placed under their charge—is guaranteed.

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Letters and Telegrams:
DR. TURNER, PLYMPTON.

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Telephone:
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FEES from £2
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Particulars on application to the
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Telegrams: "Benson, Market Lavington."

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provided for the Patients, including Billiards, Cycling, Carriage and Motor
Exercise. Tennis, Croquet, etc. Voluntary Boarders received without
Certificates. *Railway Stations:* Lavington, G.W.R., $1\frac{1}{2}$ miles; Devizes,
G.W.R., 6 miles.

For Terms, etc., apply to the MEDICAL SUPERINTENDENT.

LAVERSTOCK HOUSE

Near SALISBURY.

*A Private Home for the Care and
Treatment of Mental Disorders.*

VOLUNTARY BOARDERS RECEIVED WITHOUT CERTIFICATES.

For terms and particulars apply to MEDICAL SUPERINTENDENT.

Telegrams: Benson, Laverstock.

'Phone: 12 Salisbury.

The SILVER BIRCHES, Church Street, **EPSOM.**

**This Home has been established over 60 years for the Care
and Treatment of Ladies suffering from Mental Ailments.**

TERMS, etc., on application to—

Miss M. O. DANIEL, Res. Licensee, or to Dr. E. C. DANIEL, Co-Licensee.

Telephone: 346 P.O. Epsom.

WYE HOUSE ASYLUM, Telegrams—**BUXTON, DERBYSHIRE.** Telephone— 130 BUXTON. BUXTON 130.

It is situated on an eminence commanding extensive views of the surrounding
country. The House is heated throughout by means of hot-water apparatus and
open fireplaces. Buxton is situated on the mountain limestone formation, 1,000 feet
above sea level. The climate is wonderfully bracing, and its reputation as an
inland watering place for invalids is undoubted.

*Terms and Particulars of Wye House can be obtained on application
to the Medical Superintendent - - - W. W. HORTON, M.D.*

LONDON COUNTY MENTAL HOSPITAL, Claybury, Woodford Bridge, Essex.

Private Patients. Special accommodation for Male Paying Patients is provided at "The Hall", adjoining this Mental Hospital.

Terms: Exclusive of clothing and special luxuries, for Patients having a legal settlement in the County of London, **56s.** a week; for others **66s. 6d.** a week.

Full particulars can be obtained on application to the CHIEF OFFICER, MENTAL HOSPITALS DEPARTMENT, LONDON COUNTY COUNCIL, THE COUNTY HALL, WESTMINSTER BRIDGE, S.E. 1.

All applications will be considered in the order in which they are received.

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Telephone: New Cross 576.

AN Institution licensed for the CARE and TREATMENT of the MENTALLY AFFLICTED of both Sexes. Conveniently situated. Electric trams and omnibuses from the Bridges and West End pass the House. Private houses with electric light for suitable cases adjoining the Institution. Holiday Parties sent to the Seaside branch at Worthing during Summer months.

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Ladies and Gentlemen suffering from Mental Disorder.**

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HEIGHAM HALL, NORWICH

TELEPHONE: { FOR UPPER AND MIDDLE CLASSES. } 80 NORWICH.

**A Private Home for Cure of Ladies and Gentlemen
suffering from Nervous and Mental Diseases.**

Extensive Pleasure Grounds. Private Suites of Rooms with Special Attendants available. Boarders received without Certificates.

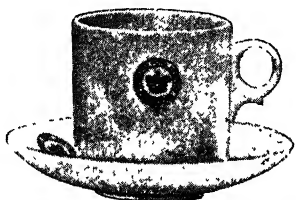
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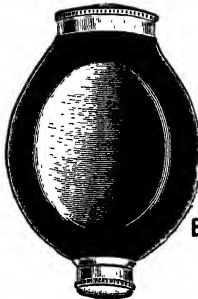
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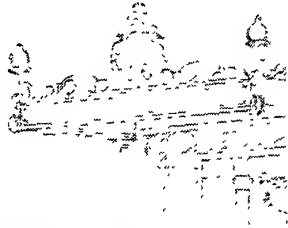
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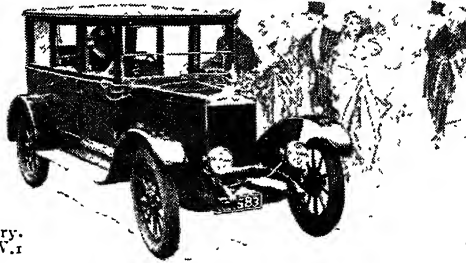
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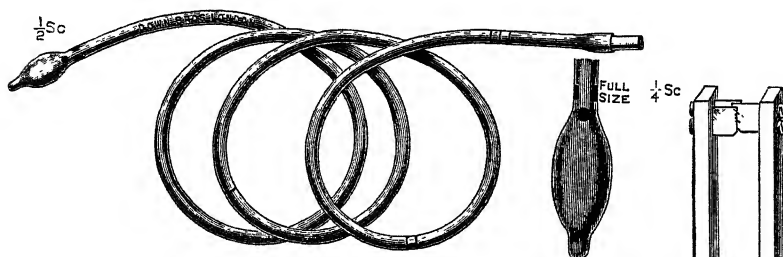
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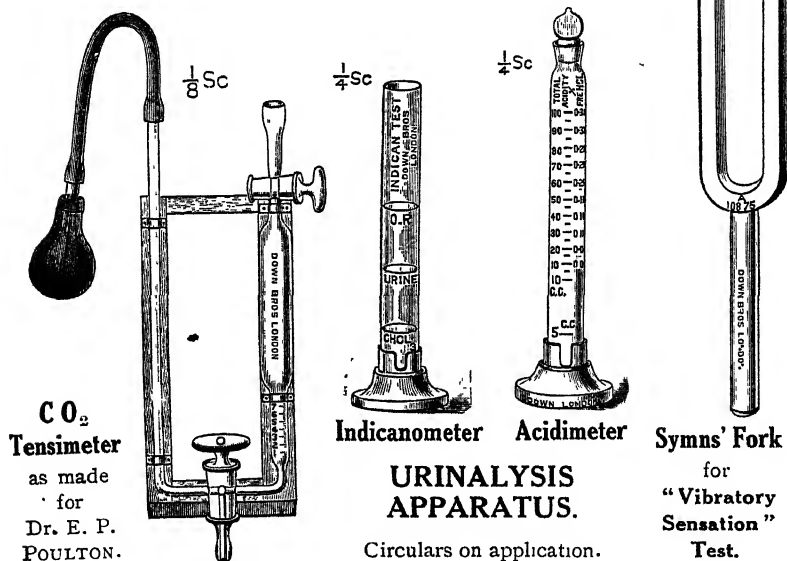
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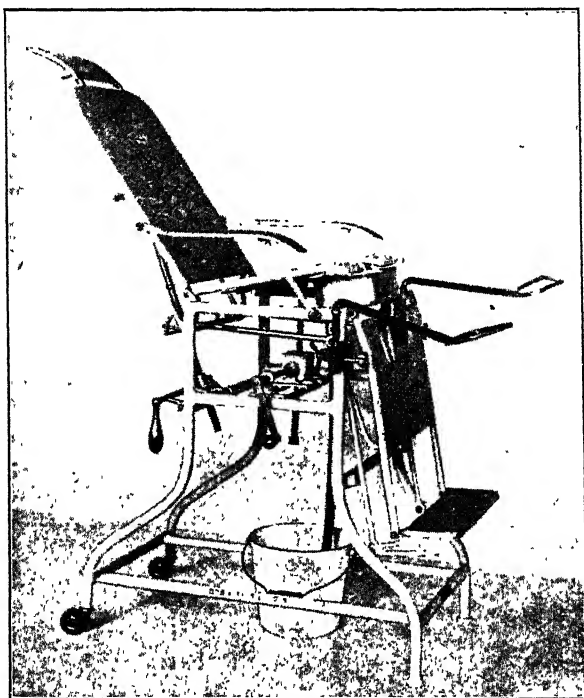
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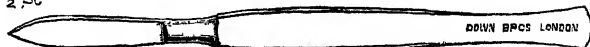
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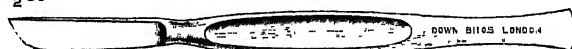
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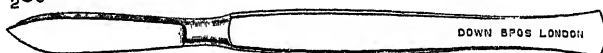
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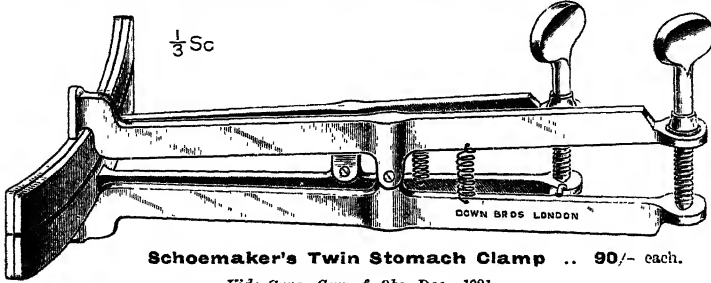
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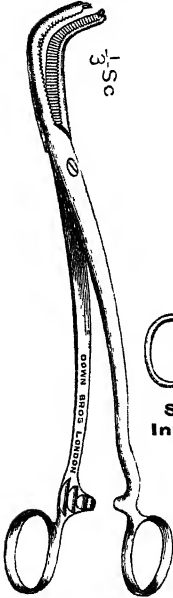
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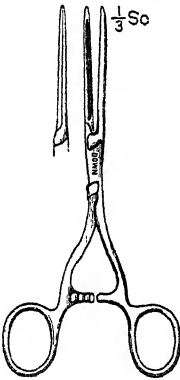
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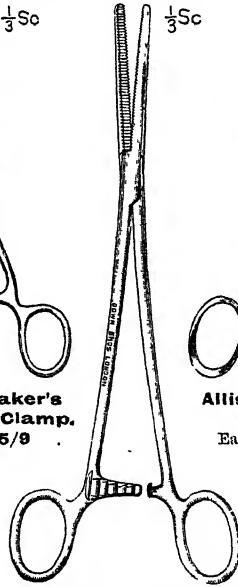


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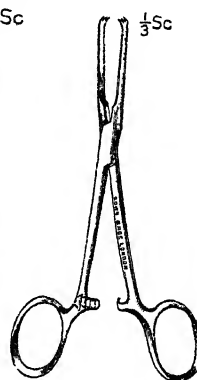


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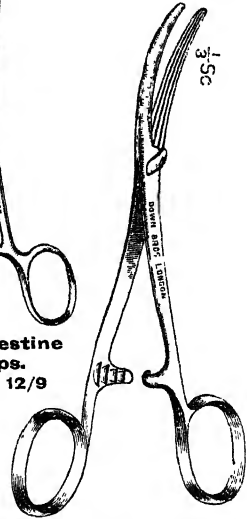
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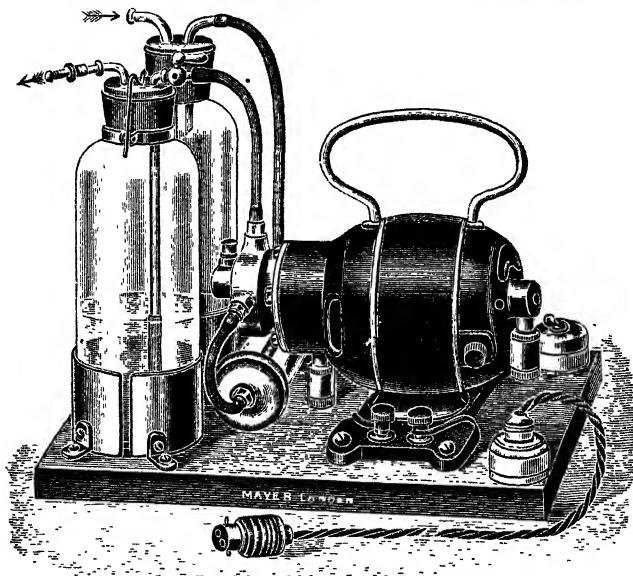
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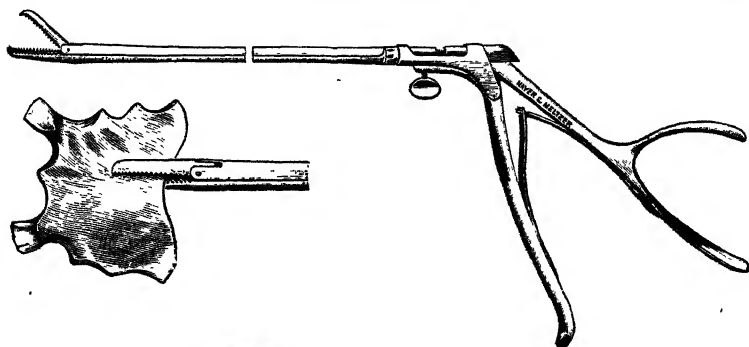
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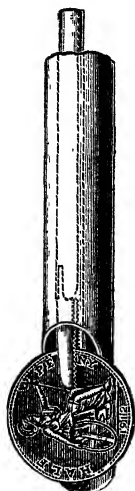
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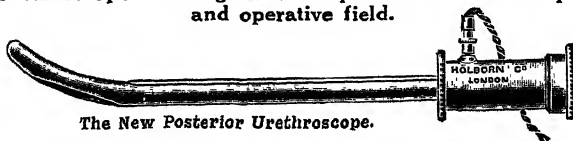


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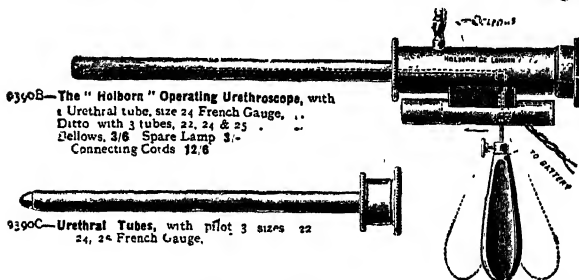
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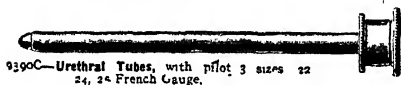
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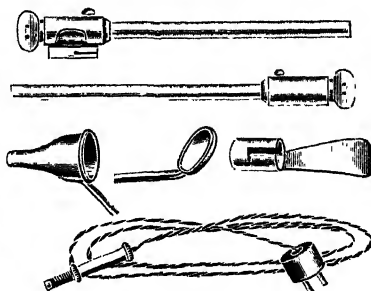
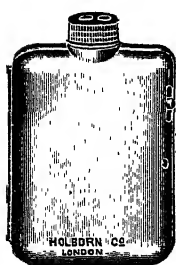


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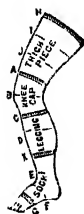
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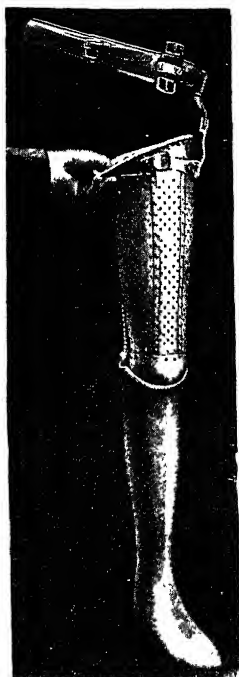
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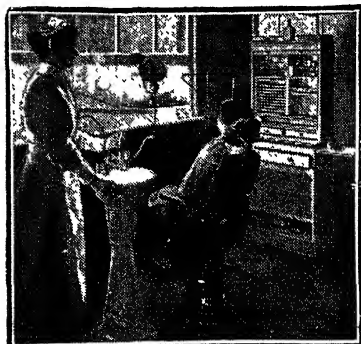
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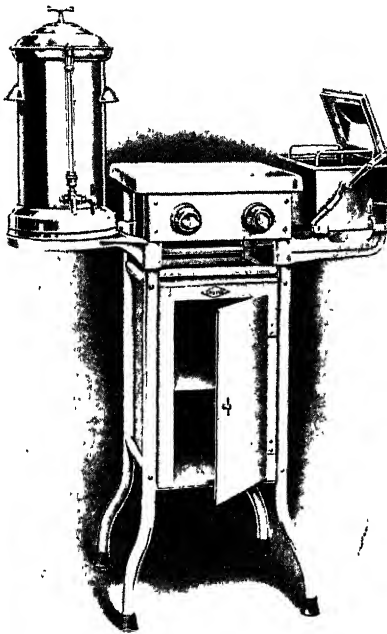


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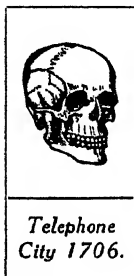
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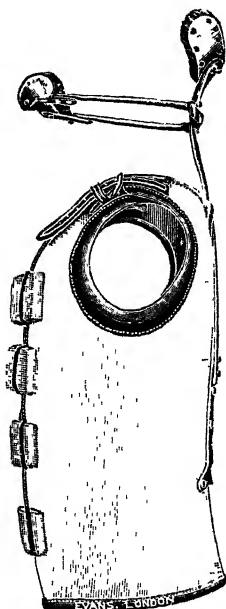
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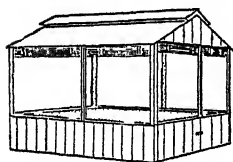
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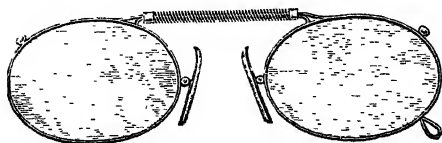
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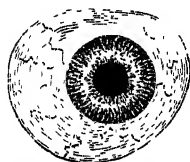
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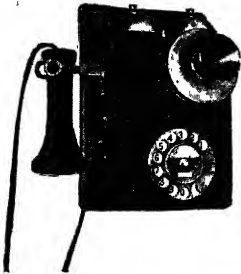
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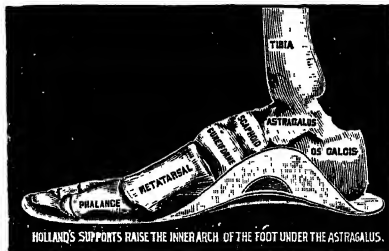
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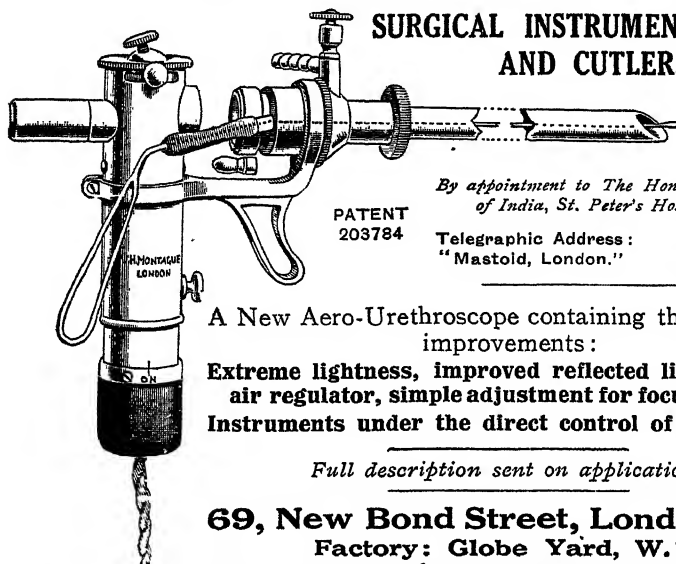
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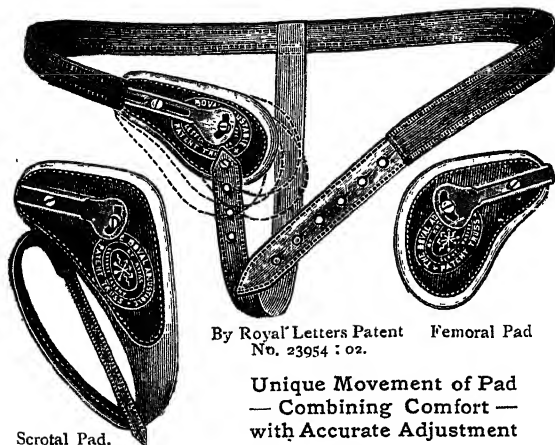
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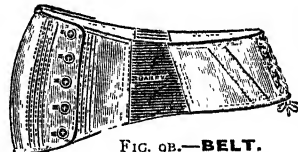
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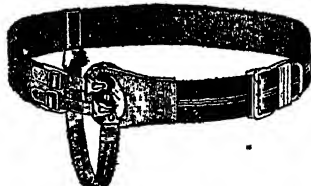
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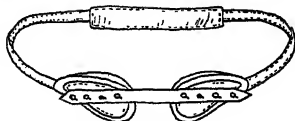
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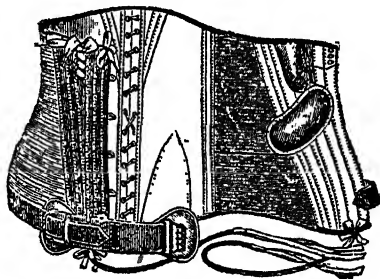


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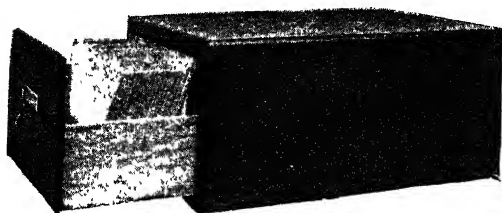
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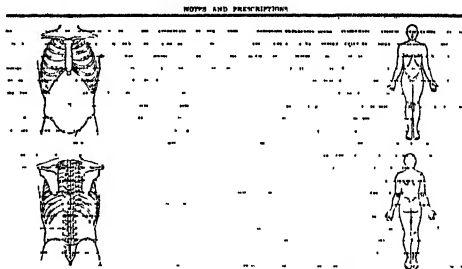
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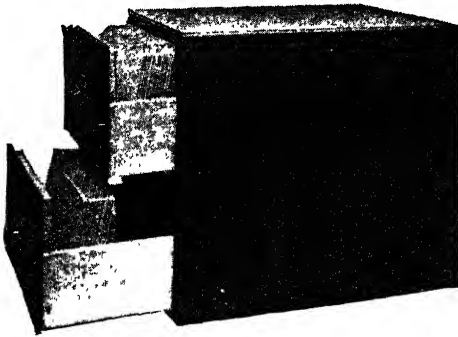
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ACCOUNT BY NAME									
DATE	DEBIT	CREDIT	DATE	DEBIT	CREDIT	DATE	DEBIT	CREDIT	DATE
1891			1892			1893			1894
1895			1896			1897			1898
1899			1900			1901			1902
1903			1904			1905			1906
1907			1908			1909			1910
1911			1912			1913			1914
1915			1916			1917			1918
1919			1920			1921			1922
1923			1924			1925			1926
1927			1928			1929			1930
1931			1932			1933			1934
1935			1936			1937			1938
1939			1940			1941			1942
1943			1944			1945			1946
1947			1948			1949			1950
1951			1952			1953			1954
1955			1956			1957			1958
1959			1960			1961			1962
1963			1964			1965			1966
1967			1968			1969			1970
1971			1972			1973			1974
1975			1976			1977			1978
1979			1980			1981			1982
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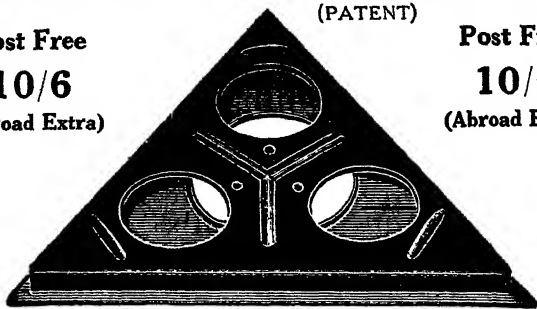
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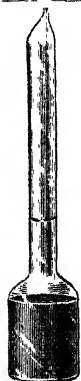
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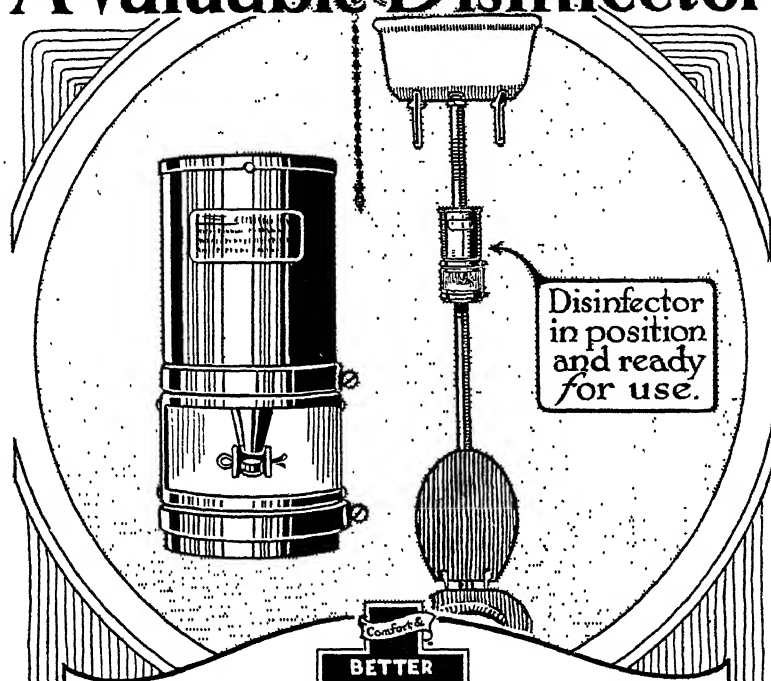
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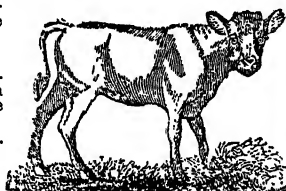
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